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Quantity-Quality Simulation (QQS)
A Detailed Continuous Planning Model for Urban Runoff Control. Volume II
Users' Manual

Dorsch Consult Ltd.
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To calculate urban stormwater and combined sewer overflow pollution and means for its control, a comprehensive mathematical model is presented. The model (Quantity-Quality Simulation) operates in a continuous mode and accounts for the unsteady runoff and overflow behavior of total drainage systems. Lumping techniques that calculate the runoff from drainage areas are combined with detailed flow routing through main and interceptor sewers as well as other structures such as branches, overflows, basins, pump stations, control gates and treatment facilities. The computer program calculates the runoff in the storm or combined sewer system and in the receiving waters. The program package, written in Standard Fortran IV, is composed of approximately 30,000 statements and can be used on any BATCH processing system having Fortran IV compliers

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QUANTITY-QUALITY SIMULATION (QQS) A DETAILED CONTINUOUS PLANNING MODEL FOR URBAN RUNOFF CONTROL

Volume II

User's Manual

by

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FOREWORD

The Environmental Protection Agency was created because of increasing public and government concern about the dangers of pollution to the health and welfare of the American people. Noxious air, foul water, and spoiled land are tragic testimony to the deterioration of our natural environment. The complexity of that environment and the interplay between its components require a concentrated and integrated attack on the problem.

Research and development comprise that necessary first step in problem solution and involve defining the problem, measuring its impact, and searching for solutions. The Municipal Environmental Research Laboratory develops new and improved technology and systems for the prevention, treatment, and management of wastewater and solid and hazardous waste pollutant discharges from municipal and community sources, for the preservation and treatment of public drinking water supplies and for the minimization of adverse economic, social, health, and aesthetic effects of pollution. This publication is one of the products of such research; a most vital communications link between the researcher and the user community.

This study describes the principles and use of the Quantity-Quality Simulation (QQS) model. The QQS model defines the impact of urban runoff on receiving waters and aids in the initial and detailed planning of abatement alternatives for pollution from storm sewer discharges and combined sewer overflows in urbanized areas.

Francis T. Mayo
Director
Municipal Environmental
Research Laboratory

PREFACE

Control of urban runoff pollution has become a focus of environmental protection activities. Satisfactory analysis of urban runoff abatement measures requires the investigation of numerous alternatives and planning variables to arrive at economical and efficient solutions. This has resulted in an increasing interest in the modeling of urban runoff.

Urban runoff models have been developed to serve one or more of the basic functions of planning, system analysis or design, and operations. A number of models was developed with only one of these functions in mind. Selection of a suitable model becomes a difficult task when two or more engineering functions are involved simultaneously. This situation is further complicated by the large variety of problems encountered in practice. A model serving multiple functions ideally should not produce more information than needed, yet should not yield such over-simplified results that its reliability is in question.

The simulation model detailed in this report was developed to serve multiple functions. It allows assessment of impacts of existing urban drainage systems on receiving waters as well as the evaluation of expected effects of structural and nonstructural mitigative alternatives. The model has been applied in the detailed planning and initial design of main system components and is considered to be applicable for the analysis of a wide variety of operations problems.

The theoretical background of this model and its data processing mode were developed during the period from 1973 to 1975. The programming was partially financed by the Federal Minister of Research and Technology of the Federal Republic of Germany (Grant No. 0825027).

Because this simulation model may well suit certain American needs within the framework of Section 201 and Section 208 studies, a research grant was provided by the U.S. Environmental Protection Agency to make this planning tool available to the American user. The model had already been used in an American city.

This report is in two volumes. Volume I describes the theoretical background, testing, and application of the model. Volume II is the user's manual for the model program.

ABSTRACT

A comprehensive mathematical model, the Quantity-Quality Simulation (QQS) model, for calculation of urban stormwater and combined sewer overflow pollution and the means for its control is presented. The model operates in a continuous mode and accounts for the unsteady runoff and overflow behavior of total drainage systems. Lumping techniques, that calculate the runoff from drainage areas, are combined with detailed flow routing through main and interceptor sewers as well as other structures such as branches, overflows, basins, pump stations, control gates, and treatment facilities. The computer program calculates the runoff in the storm or combined sewer system and in the receiving waters. The program package, written in Standard Fortran IV, comprises approximately 30,000 statements and can be used on any BATCH processing system having Fortran IV compilers.

While the QQS model is designed to operate in the continuous mode, single events may be used to calibrate and verify the model. A statistical analysis routine yields total monthly or annual runoff and overflow figures and related information such as the frequency and duration of receiving water loadings. Continuous simulations may be employed to assess a stormwater runoff, storm sewer outfall, or combined sewer overflow pollution problem and to estimate improvements that would be achieved by structural and nonstructural control and corrective measures.

Applicability of the QQS model is demonstrated in a number of comparisons with measurements of runoff quantity and several water quality parameters made in several catchments. Short descriptions of QQS model applications are given for overflow abatement studies made for: Rochester, N.Y.; Vancouver, B.C., Canada; Toronto, Ont., Canada; Augsburg, Germany; and Munich, Germany.

This is Volume II, subtitled "User's Manual" of the report, titled "Quantity-Quality Simulation (QQS), A Detailed Continuous Planning Model for Urban Runoff Control" submitted by DORSCH CONSULT LTD., Toronto, Canada, in fulfillment of research Grant No. R 805100 under the sponsorship of the U.S. Environmental Protection Agency. Volume I is subtitled "Model Description, Testing, and Applications". Work was completed as of July 1979.

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LIST OF ABBREVIATIONS

ABBREVIATIONS

BOD$_5$ -- biochemical oxygen demand (5-day)
°C -- temperature degs C
cfs -- cubic feet per second
cts -- counts
cts/5 min -- counts per 5 minutes
cts/l -- counts per liter
COD -- chemical oxygen demand
DWF -- dry-weather flow
EPA -- Environmental Protection Agency
°F -- temperature degs F
FC -- fecal coliform
ft -- feet
g -- gram
ha -- hectare
hrs -- hours
HVM -- Hydrograph Volume Method
in -- inch
kg -- kilogram
kg/5 min -- kilograms per 5 minutes
km -- kilometer
l -- liter
lb -- pound
l/s.ha -- liter per second and hectare
m -- meter
m^2 -- square meter
m^3 -- cubic meter
m^3/s -- cubic meters per second
mg -- milligram
mg/l -- milligrams per liter
min -- minutes
mm -- millimeter
mm/5 min -- millimeters per 5 minutes
N -- frequency
P -- phosphorus
Pb -- lead
ppm -- parts per million
QQS -- Quantity-Quality Simulation
R & D -- Research and Development
s -- second
SS -- suspended solids

STP -- sewage treatment plant
TSS -- total suspended solids
UWRR -- Urban Water Resources Research
WSE -- water surface elevation
yrs -- years
29.8.75 -- day.month.year, e. g. Aug. 29, 1975

NOTE: Abbreviations and symbols used in Appendices 1 to 4 only coordinate the descriptions on each page and are not contained in this list.

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ACKNOWLEDGEMENTS

The valuable suggestions for program improvements of the municipalities and agencies involved in applications of the QQS program are gratefully acknowledged.

Especially acknowledged is the valuable guidance and assistance of the Project Officer of this demonstration study, Richard Field, Chief of the Storm and Combined Sewer Section (Edison, New Jersey) of the U.S. EPA Municipal Environmental Research Laboratory, Cincinnati, Ohio. The valuable comments provided by H.C. Torno of the U.S. EPA Office of R & D (Washington, D.C.) and by D. Ammon of the Storm and Combined Sewer Section (Edison, New Jersey) of the U.S. EPA Municipal Environmental Research Laboratory, Cincinnati, Ohio, were gratefully accepted. M.B. McPherson, Director of the ASCE UWRR Program who reviewed and assisted in editing the final report is thankfully acknowledged.

Appreciation is extended to personel of Dorsch Consult: Simo Mrdja who did the systems analysis and debugging for most of the programs and who drafted Section 2 of this volume; Donatus Reich who prepared the test examples; and Mrs. Uta Gysser who performed with dedication the extensive typing job. The principal author, Wolfgang F. Geiger is now associated with the Technical University of Munich, Department of Civil Engineering, Munich, Germany.

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SECTION 1

OVERALL QQS PROGRAM DESCRIPTION

PROGRAM SYSTEM COMPENDIUM

The Quantity-Quality Simulation (QQS) model is a comprehensive mathematical model for the calculation of urban stormwater runoff and combined sewer overflows (1). A detailed description of the individual components of the QQS method is given in Section 2 of Volume I, Model Description, Testing, and Applications.

The program package of the QQS model comprises of a number of individual programs: a data edit program, a sequence of three programs necessary to perform the actual runoff simulations, a program to print the runoff hydrographs and pollutographs in the case of single events, and a statistics program to evaluate continuous simulation results. In addition, there are two optional programs included in the package. The one simulates rainfall-runoff from individual catchments (not including major sewer routing), the other analyses precipitation data statistically. Figure 1 shows the sequence in which the individual programs are applied. An overall flow chart is provided in Figure 2.

The following explanations of the functions of individual programs are intended to provide an overview of the total program package. Further information about input preparation, necessary control cards and error messages is given in Section 3 of this report, Program Handling.

The program DTCHCK checks the network, quantity and quality data for format and plausibility. In case of errorless data (according to input specifications) the internal input files for the simulation part of the package are created.

The program DWTFLC simulates one full day under dry-weather flow conditions and establishes internal files (IF13 and IF21), containing a daily cycle of dry-weather flows at all network nodes.

TXTFCE provides the output headings TXTFCG provides for metric units.

RCVRIN and MNTWKC perform the actual simulations of quantities and qualities of runoff from the catchments and their transport throughout the sewer network.

MNTWSP prints single event simulation results which were written by MNTWKC on an internal file (IF23).

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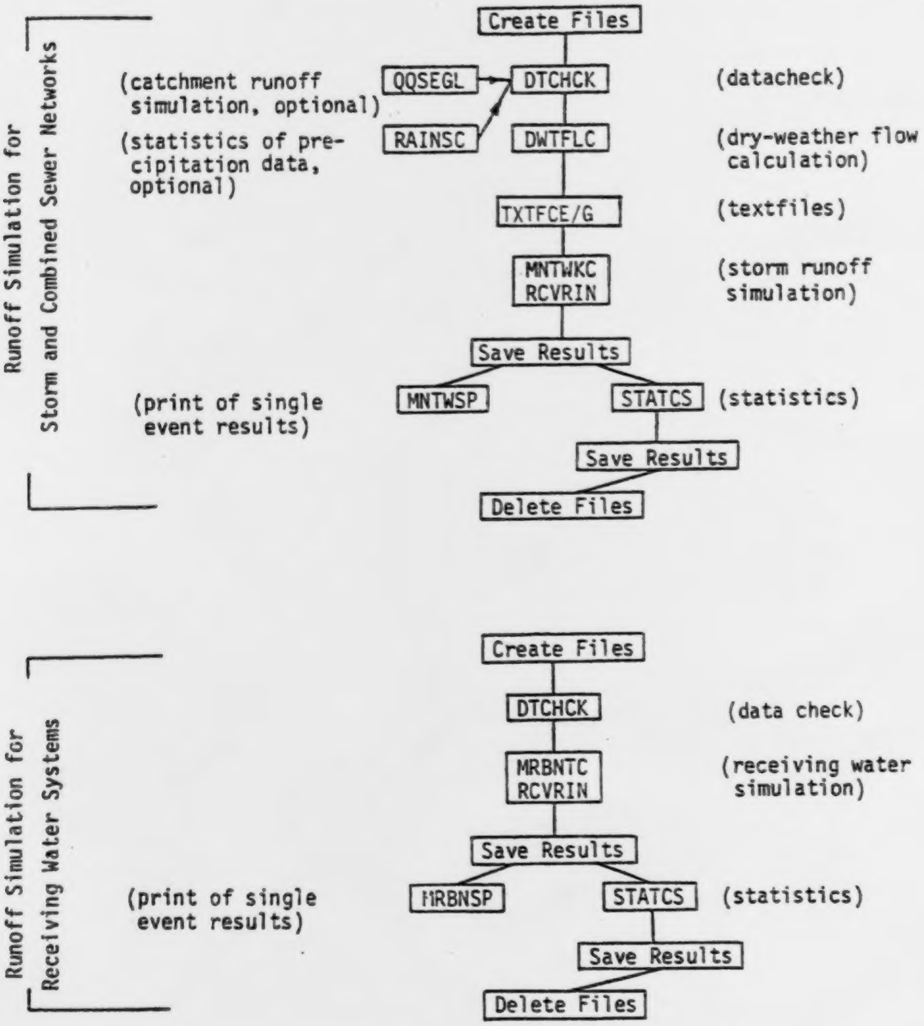
Runoff Simulation for
Storm and Combined Sewer Networks
Create Files
(catchment runoff simulation, optional)
QQSEGL
DTCHCK
(datacheck)
(statistics of precipitation data, optional)
RAINSC
DWTFLC
(dry-weather flow calculation)
TXTFCE/G
(textfiles)
MNTWKC
RCVRIN
(storm runoff simulation)
Save Results
(print of single event results)
MNTWSP
STATCS
(statistics)
Save Results
Delete Files
Runoff Simulation for
Receiving Water Systems
Create Files
DTCHCK
(data check)
MRBNTC
RCVRIN
(receiving water simulation)
Save Results
(print of single event results)
MRBNSP
STATCS
(statistics)
Save Results
Delete Files

Figure 1. Runstream of the individual QQS programs.

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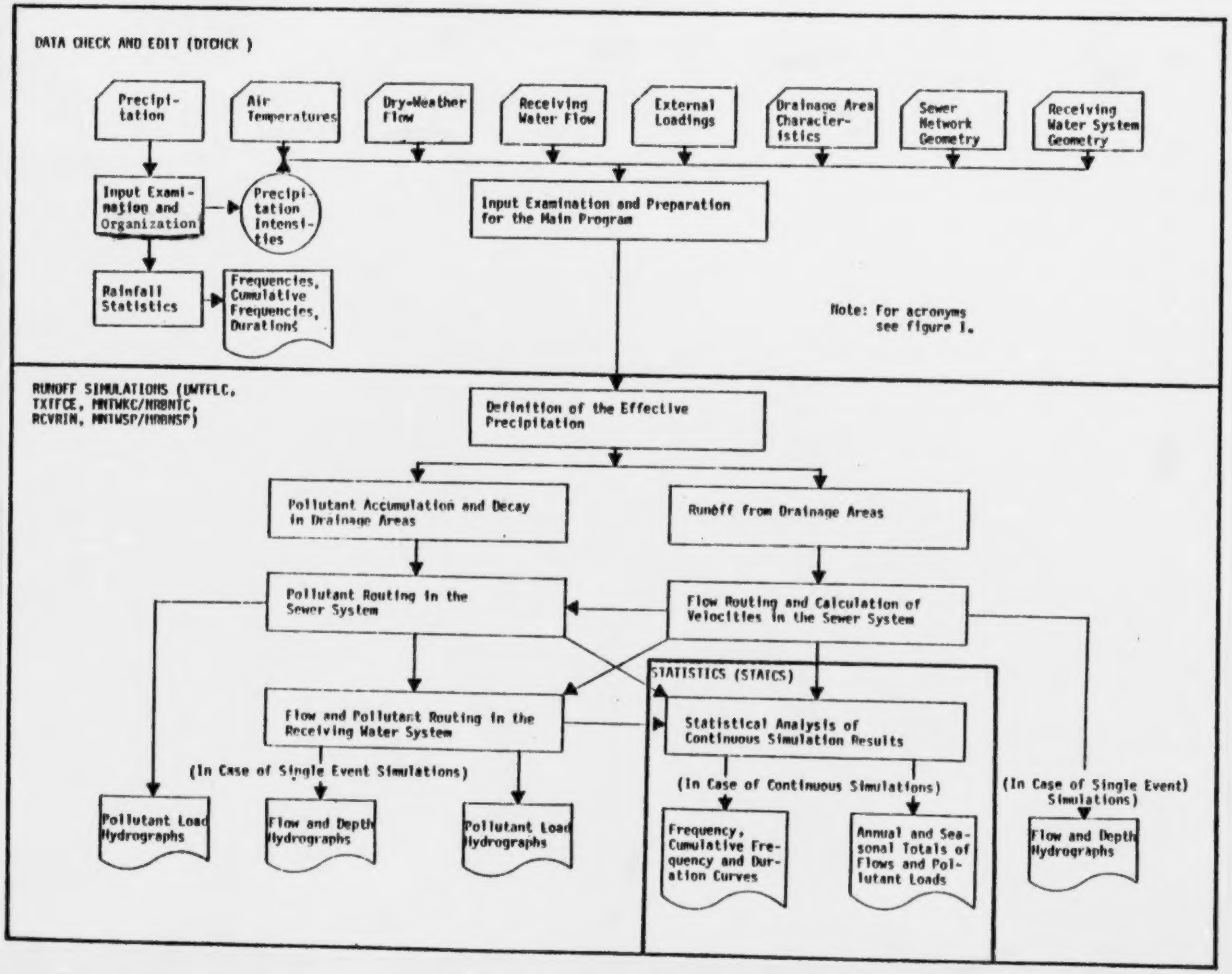
DATA CHECK AND EDIT (DTCHCK)
Precipi-tation
Air Temperatures
Dry-Weather Flow
Receiving Water Flow
External Loadings
Drainage Area Character-istics
Sewer Network Geometry
Receiving Water System Geometry
Input Exami-nation and Organization
Precipi-tation intensi-ties
Input Examination and Preparation for the Main Program
Rainfall Statistics
Frequencies, Cumulative Frequencies, Durations
Note: For acronyms see figure 1.
RUNOFF SIMULATIONS (DWTFLC, TXTFCE, MNTWKC/NRBNTC, RCVRIN, MNTWSP/NRBNSP)
Definition of the Effective Precipitation
Pollutant Accumulation and Decay in Drainage Areas
Runoff from Drainage Areas
Pollutant Routing in the Sewer System
Flow Routing and Calculation of Velocities in the Sewer System
STATISTICS (STATCS)
Flow and Pollutant Routing in the Receiving Water System
Statistical Analysis of Continuous Simulation Results
(In Case of Single Event Simulations)
(In Case of Continuous Simulations)
(In Case of Single Event) Simulations)
Pollutant Load Hydrographs
Flow and Depth Hydrographs
Pollutant Load Hydrographs
Frequency, Cumulative Fre-quency and Dur-ation Curves
Annual and Sea-sonal Totals of Flows and Pol-lutant Loads
Flow and Depth Hydrographs

Figure 2. Overall flow chart.

For practical application of the QQS program package it has been found beneficial to treat the sewer network and the receiving water as separate systems, even though runoff and pollutant transport calculations in both systems employ the same principles. This separation permits the performance of data checks and simulations for verification or related purposes individually for the sewer system or the receiving water system without handling the other system component simultaneously. Therefore, for the sewer system and receiving water system, individual program versions have been established which differ mainly in their capacity. These individual program versions also contribute to more economical computer use.

The pertinent program names for receiving water system routing are RCVRIN, MRBNTC and MRBNSP. Receiving water network routing can be started only after a corresponding sewer network simulation has been completed.

The results of continuous long-term simulations are stormwater discharges, combined sewer overflows, their pollution quantities, and receiving water loadings at specified nodes. These data are organized and statistically evaluated in STATCS. One-dimensional and two-dimensional statistical analyses are performed for those properties and nodal points designated in the initial input instructions.

QQSEGL is a program which facilitates calibration and verification of drainage area calculations. This program simulates quantity and quality of runoff from individual drainage areas and is an excerpt of the pertinent subroutines of MNTWKC. This program is included in the package, but its use is optional.

The program RAINSC provides a statistical analysis of precipitation data and serves to select a suitable time span from longer rainfall observations for continuous rainfall-runoff simulations. This program is included in the package, but its use is optional.

The use of additional programs may prove beneficial, e. g., the HEC1 program for derivation of unit hydrographs (3), depending on individual project needs.

PROGRAM SYSTEM CAPACITY

The capacity of the QQS program system as described in this report is sufficient for normal applications of total service areas up to approximately 6,000 ha (15,000 acres) in size. At this approximate upper limit, with 100 drainage areas their average size would be 60 ha (150 acres). Considerable departures from these figures may be encountered in applications to diverse service areas. Regardless of the size of the total service area, three different rainfall records may be handled simultaneously in the simulations. Each of these records is ascribed to a fixed area by input. To a certain degree this will provide some consideration for nonuniformity in the distribution of precipitation. From one to four pollutants can be considered simultaneously in one simulation run. If necessary, additional pollutants may be handled in subsequent runs.

Single event simulations can be made for a period of up to 24 hours. The time step is fixed at five minutes. Although it is desirable for the scope of urban runoff simulation to derive the pertinent input from records allowing for similar fine interpretation, it is still possible to interpolate the input data required in five-minute detail from less refined records. Single event simulations required for more than one day of data may be performed by splitting the event and adjusting the initial conditions of successive runs.

Continuous simulations of up to 20 years, the time step being fixed at five minutes, are possible, but to save computing costs the selection of a 4- to 8-year period based on statistical analysis of precipitation criteria has been found to suffice without sacrificing reliability.

Either metric or English units can be used, except for programs QQSEGL and RAINSC which allow for metric input only. The major data processing capabilities are summarized in Table 1. It should be noted that the program dimensions given are not rigid but may be adjusted by the programmer to accommodate larger areas and individual needs.

TABLE 1. DATA PROCESSING CAPABILITIES OF THE PROGRAM SYSTEM

Maxima		
Length of data for a single event simulation		24 hrs
Length of data for a continuous simulation		20 yrs
Statistical variables, total cases		118
Precipitation stations		3
Conservative pollutants		4
Area types (considering pervious and impervious separately)		4(8)
Receiving waters arbitrarily connected		2
Sewer network	- system elements	400
	- nodes	370
Drainage areas		100
Special structures	- overflows	35
	- basins and pumps	15
	- operational controls	20
External loadings	- constant	18
	- variable (only for single event simulation)	10
Receiving waters	- system elements	150
	- nodes	130
Specified nodes for statistical analyses	- special structures	50
	- arbitrary nodes	5

INPUT DATA OVERVIEW

Input Data for the Runoff Simulation Programs

Input data for the runoff simulation programs (MNTWKC/MRBNTC and RCVRIN) are divided into four groups: precipitation, network and drainage area, quantity, and quality. All input may be provided in metric or English units. Format requirements for all input data are provided in Section 3, Program Handling. In order to facilitate application and to avoid wasting computing time, these input data are checked by an extensive data edit program (DTCHCK) for errors and for plausibility. Such a data edit is critical for efficient and economical application of a comprehensive simulation model. Some of the drainage area, quantity and quality data are also required as inputs for the program QQSEGL for simulating the runoff from individual drainage areas. The precipitation data as prepared for runoff simulations also serve as inputs for the rainfall statistics program (RAINSC). However, input to the programs QQSEGL and RAINSC only can be provided in metric units.

Precipitation Data--
As discussed in Section 1 of Volume I (Model Description, Testing, and Applications) continuous runoff simulations are sought in order to define storm sewer discharge and combined sewer overflow behavior. To perform such a continuous simulation, an equally continuous record of precipitation data must be prepared as an input.

Precipitation intensities have to be supplied at 5-minute time intervals and dry spells between individual events must be specified. Gaps in a precipitation record should be filled with estimated values. The checking of continuous precipitation records against daily totalizer registrations is advisable.

The 5-minute rainfall intensity values required may be derived from original continuous recordings of cumulative depth. In order to include a broad spectrum of events it is necessary to refer to a record of 15 to 20 years duration. According to experience, however, it is not imperative that runoff simulations be performed for such a complete record. It is sufficient for runoff simulation purposes to select a grouping of four to six representative years from a long rainfall record. Selection may be aided by statistical analysis of the rainfall data by employing the program RAINSC to investigate major properties, e.g.:

- Rainfall duration (min)
- Dry spell (min)
- Time elapsed from start of rainfall to the 5-minute interval with maximum rainfall intensity (min)
- Volume of rainfall (mm)
- Average rainfall intensity (mm /5 min)
- Ratio of average to maximum rainfall intensity
- Individual rainfall intensities of the 5-minute intervals (mm/min)

In the case of continuous runoff simulations, the precipitation data enter the program DTCHCK on a separate precipitation file. In the case of single event simulations, the precipitation data are supplied for input together with the network and drainage area data.

Network and Drainage Area Data--

The network and drainage area data consist mainly of geometrical data defining the sewer network, receiving water system and drainage areas. For single event simulations the precipitation data are entered with the network data.

For practical application of the QQS program package, it has proven beneficial to treat the sewer network and receiving waters as separate systems, even though runoff and pollutant transport calculations are performed for both systems according to the same principles. This separation makes it possible to perform data checks and simulations for verification or abatement purposes, individually for the sewer network or the receiving water system, without the need for handling both system components simultaneously. Therefore, individual program versions were established for the sewer and receiving water systems, differing mainly in their capacity. The connection of the sewer system and receiving water system takes place at storm sewer outfall and combined sewer overflow locations.

The major network input data define the individual segment shapes, dimensions, roughness and invert elevations, and the logical connections of segments. For structures within the network, additional data such as weir heights and lengths, overflow coefficients, pumping characteristics, and control gate settings have to be provided. Control gates may be operated as a function of time or of the water surface elevation at any node within the sewer network. Defined are also segments and nodes: for which single event simulation hydrograph printouts are desired; for which continuous simulation results have to be statistically analyzed - these are called nodes of interest (storm sewer outfalls, combined sewer overflows, and basins) and special nodes of interest (any ordinary network node with one inflow and one outflow); and where constant or variable external loadings enter the calculation area at boundary nodes. In order to allow for statistical analysis of storm sewer discharge data, storm sewer discharges must be handled as if they occurred at overflow structures.

The major drainage area characteristics are drainage area types, sizes, ratios of impervious to pervious areas, population densities and industrial wastewater inflows. Individual drainage areas are indexed to one of the three precipitation station records and to a sewer system node.

Most of the network and drainage area data may be derived from sewer network plans and aerial photographs. In modeling a sewer network or receiving water system, one should not attempt to achieve an exact geometrical portrayal of the prototype but should establish a computational description of the hydraulic features determining the runoff, outfall, and overflow processes.

Network and drainage area data enter the program DTCHCK. For runoff simulations from individual drainage areas the drainage area characteristics are entered only into the program QQSEGL.

Quantity Data--

The quantity data are mainly those data necessary to determine the runoff quantity from drainage areas and dry-weather flows. Initial or starting losses and soil infiltration capacities are needed to evaluate effective precipitation. Evaporation rates, temperature data, and soil infiltration capacities are required to determine the depression capacities available at the start of a rainfall event. Temperature data and evaporation rates usually are taken from official registrations. Initial or starting losses and soil infiltration capacities are defined according to values given in the literature and from local experience.

Unit hydrographs for determining runoff from drainage areas may be established synthetically or may be derived from precipitation-runoff recordings. Final determination of unit hydrographs may be aided by comparing the runoff from individual drainage areas calculated by the program QQSEGL with recorded runoff, or by comparisons with runoff data calculated by other, possibly more detailed methods.

Diurnal variations of dry-weather flow, boundary flow conditions, and receiving water flows are also specified in this data group. These data are obtained from meteorological surveys, waterworks records, etc.

All of these data also enter the program DTCHCK. Initial or starting losses, soil infiltration capacities, and unit hydrographs are also required as input for the program QQSEGL.

Quality Data--

The quality data consist mainly of information necessary to determine runoff and dry-weather flow quality. For pollutant balance calculations, maximum and initial pollutant values and pollutant build-up times and functions, are specified for the different drainage-area types. Also provided are data describing the frequency and efficiency of street cleaning.

Unit pollutographs, the influences of rainfall duration and diurnal and seasonal variations, all of which determine the pollutant wash-off from drainage areas, should be derived from rainfall-runoff quality measurements. The final definition of these functions is facilitated by the program QQSEGL by comparing in a number of sequential runs the calculated pollutant load runoff from individual drainage areas with measured data. Because areas with similar characteristics have similar unit hydrographs and unit pollutographs, the user may gain experience by analyzing some of the many rainfall-runoff measurements reported in Section 4 of Volume I, Model Description, Testing, and Applications.

Also specified in the quality data group are diurnal variation of dry-weather flow quality, water quality boundary conditions, receiving water background pollution, and the removal effects of detention basins and treatment facilities. Most of these data may be obtained from waterworks records, local surveys, and the literature.

All of these data are entered into the program DTCHCK. Pollutant load variations and the factors modifying their influence that account for the time of day and rainfall duration are required as input for the program QQSEGL as well.

Input Data for the Statistical Programs

Runoff Statistics--

Two levels of input enter the statistics program STATCS, namely, continuous simulation results and data specifying the type and extent of statistical analysis. For a sewer network simulation, continuous runoff results are provided at nodes of interest and at special nodes of interest specified by input to the program DTCHCK as part of the network and drainage area data. At storm sewer outfalls and combined sewer overflows, which were defined as nodes of interest, the discharge and overflow rates and pollutant loads enter the program STATCS by way of internal files. The same is true for the ingoing and outgoing flows at basins during a time of surcharge conditions. This also applies to the ordinary network nodes with one inflow and one outflow which were defined as special nodes of interest.

For a receiving water system, continuous runoff quantity and quality results at the nodes of interest of that system enter the program STATCS by way of internal files. Any junction in a receiving water system, where one branch of the junction is a sewer segment loading to receiving waters, may there be defined as node of interest.

The second type of input to the program STATCS determines the properties investigated and their scales: whether one- or two-dimensional; if monthly or annual statistics are to be performed; and whether tabular or graphical output is desired.

Precipitation Statistics--

Similarly, the program RAINSC calls for two levels of input in order to perform a statistical analysis of the precipitation data. Precipitation records must be supplied on file in the same format required for the program DTCHCK. The second type of input is a designation of the choice of years and months to be considered and whether monthly or annual statistics must be performed.

OUTPUT DATA

Runoff Simulation Results

Runoff from Individual Drainage Areas--

Single event simulations of runoff from individual drainage areas as performed by the program QQSEGL are used mainly for verification purposes and may be made for a maximum of 99 intervals of 5-minute duration each.

The output of the program QQSEGL contains the input data and the calculated runoff hydrographs. Figure 3 shows an example of output for a case where only runoff quantity was calculated. T indicates the number of 5-minute time intervals after the start of rainfall. RFDPT represents the rainfall intensity (1/1,000 mm per 5 min); THRLP represents the initial or starting losses for impervious areas (1/1,000 mm); EFRBA is the effective precipitation for impervious areas (1/1,000 mm per 5 min); THRLG is the starting losses for pervious areas (1/1,000 mm); SEEPG is the infiltration rate (1/1,000 mm per 5 min), and EFRGA is the effective precipitation as applied to pervious areas. The calculated flow hydrographs from impervious areas are marked by WQBA (m^3/s), the flow from pervious areas by WQGA (m^3/s) and the total runoff by WQTOT (m^3/s). MSWQ (m^3/s) is a listing of the measured runoff as supplied by input and DWQ (m^3/s) gives the difference between the calculated and measured runoff.

Figure 4 provides a listing of the output for a case where runoff quantity and quality are calculated. As a departure from and in addition to the above explained headings, INT indicates the number of 5-minute time intervals after the start of rainfall; DLPHB and DLPHG the pollutant load runoff per hectare in kg per interval from impervious and pervious areas, respectively; and ADLTOT the total runoff of pollutant loads in kg per interval from the drainage area in question. MSDQ indicates the measured data and DDQ is the difference between calculated and measured values, both in kg per interval. The concentration of the pollutant in the runoff from the total drainage area is provided by CNTRN (3.33 mg/l). The pollution related output is given for two pollutants, which is the most that may be considered by the program QQSEGL.

Runoff in the sewer and receiving water system--

By sequencing the programs DTCHCK, DWTFLC, TXTFCE, RCVRIN, MNTWKC and MNTWSP, single event simulations of the runoff in storm and combined sewer networks can be performed for a maximum of 288 5-minute intervals. Similar simulations may be made for receiving water systems using the programs DTCHCK, RCVRIN, MRBNTC and MRBNSP.

Single event simulations are used principally to calibrate input data, to verify the program package and to check, on the basis of synthetic or real storms the comparative effectiveness of different storm sewer discharge and combined sewer overflow abatement alternatives.

The programs MNTWSP and MRBNTC provide the output of single event runoff simulations of the sewer system and receiving water system respectively. Flow, depth or pressure, and pollutant load hydrographs may be obtained for any element in the sewer and receiving water systems.

For the sewer or receiving water system sections, Figure 5, the flow and depth or pressure values are given at the upstream (QU, HU) and downstream (QD, HD) ends of an element. The pollutant load values (P1, P2, P3, P4) refer to the downstream end of the segment. Metric units are shown in Figure 5. If the output is provided in English units, instead, in addition the corresponding concentrations are given.

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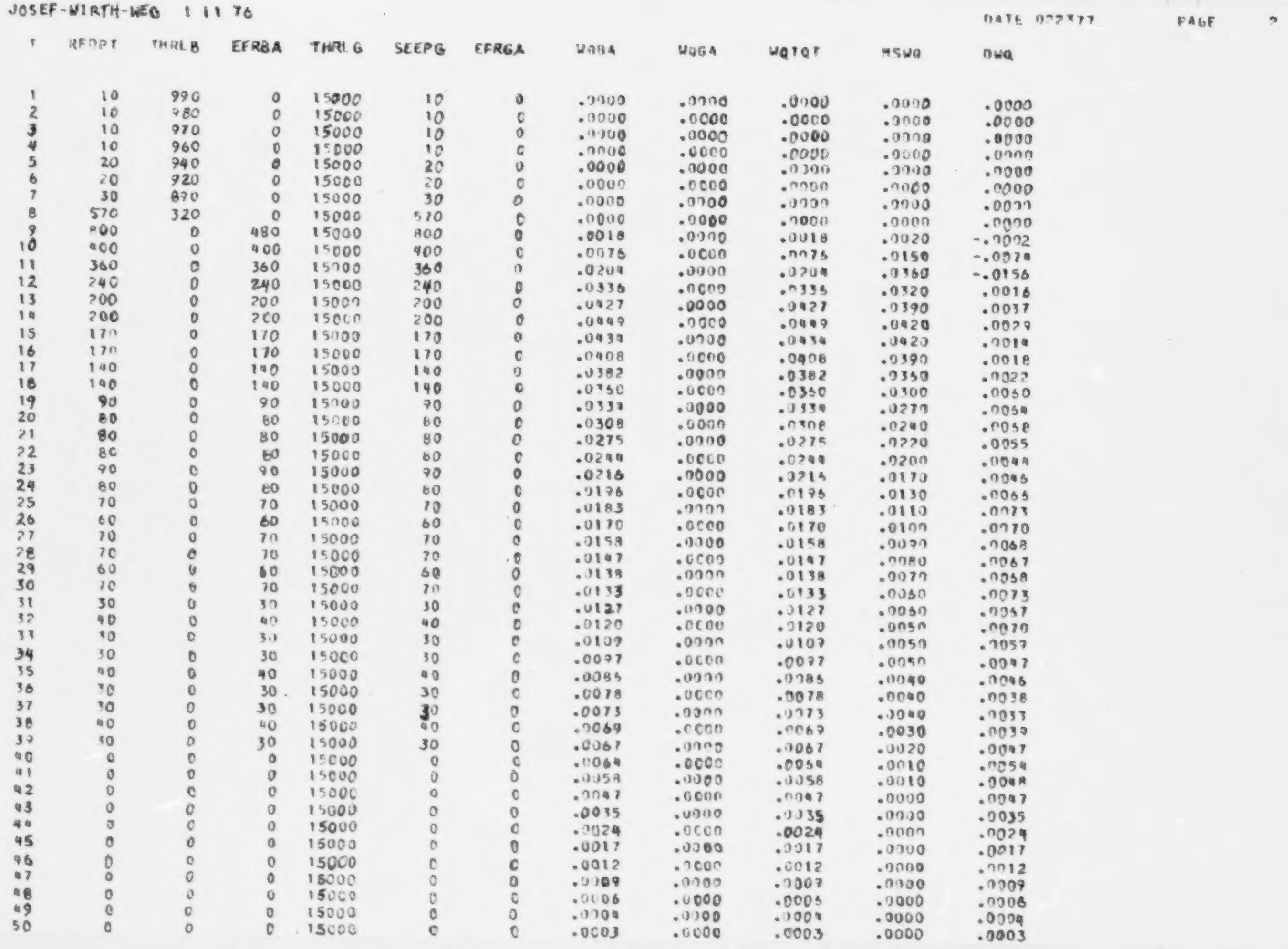

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  T    REDPT   THRLB   EFRBA   THRLG   SEEPG   EFRGA     WQBA      WQGA      WQTQT     MSWQ      DWQ

  1     10      990      0     15000     10      0      .0000     .0000     .0000     .0000     .0000
  2     10      980      0     15000     10      0      .0000     .0000     .0000     .0000     .0000
  3     10      970      0     15000     10      0      .0000     .0000     .0000     .0000     .0000
  4     10      960      0     15000     10      0      .0000     .0000     .0000     .0000     .0000
  5     20      940      0     15000     20      0      .0000     .0000     .0000     .0000     .0000
  6     20      920      0     15000     20      0      .0000     .0000     .0000     .0000     .0000
  7     30      890      0     15000     30      0      .0000     .0000     .0000     .0000     .0000
  8    570      320      0     15000    570      0      .0000     .0000     .0000     .0000     .0000
  9    800        0    480     15000    800      0      .0018     .0000     .0018     .0020    -.0002
 10    400        0    400     15000    400      0      .0076     .0000     .0076     .0150    -.0074
 11    360        0    360     15000    360      0      .0204     .0000     .0204     .0360    -.0156
 12    240        0    240     15000    240      0      .0336     .0000     .0336     .0320     .0016
 13    200        0    200     15000    200      0      .0427     .0000     .0427     .0390     .0037
 14    200        0    200     15000    200      0      .0449     .0000     .0449     .0420     .0029
 15    170        0    170     15000    170      0      .0434     .0000     .0434     .0420     .0014
 16    170        0    170     15000    170      0      .0408     .0000     .0408     .0390     .0018
 17    140        0    140     15000    140      0      .0382     .0000     .0382     .0360     .0022
 18    140        0    140     15000    140      0      .0350     .0000     .0350     .0300     .0050
 19     90        0     90     15000     90      0      .0334     .0000     .0334     .0270     .0064
 20     80        0     80     15000     80      0      .0308     .0000     .0308     .0240     .0068
 21     80        0     80     15000     80      0      .0275     .0000     .0275     .0220     .0055
 22     80        0     80     15000     80      0      .0244     .0000     .0244     .0200     .0044
 23     90        0     90     15000     90      0      .0216     .0000     .0216     .0170     .0046
 24     80        0     80     15000     80      0      .0196     .0000     .0196     .0130     .0065
 25     70        0     70     15000     70      0      .0183     .0000     .0183     .0110     .0073
 26     60        0     60     15000     60      0      .0170     .0000     .0170     .0100     .0070
 27     70        0     70     15000     70      0      .0158     .0000     .0158     .0090     .0068
 28     70        0     70     15000     70      0      .0147     .0000     .0147     .0080     .0067
 29     60        0     60     15000     60      0      .0138     .0000     .0138     .0070     .0068
 30     70        0     70     15000     70      0      .0133     .0000     .0133     .0060     .0073
 31     30        0     30     15000     30      0      .0127     .0000     .0127     .0060     .0067
 32     40        0     40     15000     40      0      .0120     .0000     .0120     .0050     .0070
 33     30        0     30     15000     30      0      .0109     .0000     .0109     .0050     .0059
 34     30        0     30     15000     30      0      .0097     .0000     .0097     .0050     .0047
 35     40        0     40     15000     40      0      .0086     .0000     .0086     .0040     .0046
 36     30        0     30     15000     30      0      .0078     .0000     .0078     .0040     .0038
 37     30        0     30     15000     30      0      .0073     .0000     .0073     .0040     .0033
 38     40        0     40     15000     40      0      .0069     .0000     .0069     .0030     .0039
 39     30        0     30     15000     30      0      .0067     .0000     .0067     .0020     .0047
 40      0        0      0     15000      0      0      .0064     .0000     .0064     .0010     .0054
 41      0        0      0     15000      0      0      .0058     .0000     .0058     .0010     .0048
 42      0        0      0     15000      0      0      .0047     .0000     .0047     .0000     .0047
 43      0        0      0     15000      0      0      .0035     .0000     .0035     .0000     .0035
 44      0        0      0     15000      0      0      .0024     .0000     .0024     .0000     .0024
 45      0        0      0     15000      0      0      .0017     .0000     .0017     .0000     .0017
 46      0        0      0     15000      0      0      .0012     .0000     .0012     .0000     .0012
 47      0        0      0     15000      0      0      .0009     .0000     .0009     .0000     .0009
 48      0        0      0     15000      0      0      .0006     .0000     .0006     .0000     .0006
 49      0        0      0     15000      0      0      .0004     .0000     .0004     .0000     .0004
 50      0        0      0     15000      0      0      .0003     .0000     .0003     .0000     .0003
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Figure 3. Program QQSEGL, simulation results of runoff quantity.

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                                                      DIRT TYPE 1                                      DIRT TYPE 2
INT    WQBA     WQGA    WQTOT     MSWQ      DLPHB  DLPHG ADLTOT   MSDQ     DDQ  CNTRN     DLPHB  DLPHG ADLTOT   MSDQ     DDQ  CNTRN

  1  0.0000   0.0000   0.0000   0.0000      0.000  0.000  0.000  0.000   0.000   0.00     0.000  0.000  0.000  0.000   0.000   0.00
  2  0.0000   0.0000   0.0000   0.0000      0.000  0.000  0.000  0.000   0.000   0.00     0.000  0.000  0.000  0.000   0.000   0.00
  3  0.0000   0.0000   0.0000   0.0080      0.000  0.000  0.000  1.000  -1.000   0.00     0.000  0.000  0.000  1.000  -1.000   0.00
  4  0.0500   0.0000   0.0500   0.0450      1.577  0.000  4.105  4.700  -0.595  82.13     1.961  0.000  5.104  5.900  -0.796 102.13
  5  0.1465   0.0000   0.1465   0.1400      3.023  0.000  7.870  8.000  -0.130  53.73     4.460  0.000 11.610 12.000  -0.390  79.27
  6  0.1616   0.0000   0.1616   0.1650      2.443  0.000  6.358  6.500  -0.142  39.35     4.051  0.000 10.545 11.000  -0.455  65.27
  7  0.1059   0.0000   0.1059   0.1100      1.484  0.000  3.864  3.600   0.264  36.47     2.631  0.000  6.850  7.600  -0.750  64.65
  8  0.0763   0.0000   0.0763   0.0800      1.166  0.000  3.034  2.600   0.434  39.79     2.217  0.000  5.771  5.800  -0.029  75.67
  9  0.0654   0.0000   0.0654   0.0630      0.847  0.000  2.206  1.800   0.406  33.71     1.847  0.000  4.808  4.600   0.208  73.50
 10  0.0456   0.0000   0.0456   0.0480      0.513  0.000  1.335  1.200   0.135  29.25     1.279  0.000  3.330  3.500  -0.170  72.96
 11  0.0317   0.0000   0.0317   0.0360      0.306  0.000  0.796  0.800  -0.004  25.11     0.930  0.000  2.420  2.600  -0.180  76.30
 12  0.0253   0.0000   0.0253   0.0280      0.190  0.000  0.496  0.600  -0.104  19.56     0.685  0.000  1.783  1.900  -0.117  70.36
 13  0.0232   0.0000   0.0232   0.0240      0.150  0.000  0.390  0.400  -0.010  16.82     0.535  0.000  1.391  1.400  -0.009  59.97
 14  0.0210   0.0000   0.0210   0.0200      0.109  0.000  0.285  0.300  -0.015  13.56     0.377  0.000  0.982  1.000  -0.018  46.77
 15  0.0154   0.0000   0.0154   0.0160      0.070  0.000  0.183  0.200  -0.017  11.86     0.237  0.000  0.616  0.500   0.116  39.87
 16  0.0104   0.0000   0.0104   0.0110      0.041  0.000  0.107  0.100   0.007  10.31     0.153  0.000  0.399  0.400  -0.001  38.35
 17  0.0058   0.0000   0.0058   0.0070      0.021  0.000  0.055  0.000   0.055   9.57     0.087  0.000  0.226  0.200   0.026  39.16
 18  0.0029   0.0000   0.0029   0.0040      0.011  0.000  0.028  0.000   0.028   9.68     0.049  0.000  0.127  0.100   0.027  43.18
 19  0.0016   0.0000   0.0016   0.0020      0.005  0.000  0.014  0.000   0.014   8.63     0.029  0.000  0.076  0.000   0.076  46.24
 20  0.0009   0.0000   0.0009   0.0010      0.002  0.000  0.006  0.000   0.006   6.49     0.016  0.000  0.043  0.000   0.043  49.55
 21  0.0004   0.0000   0.0004   0.0000      0.001  0.000  0.002  0.000   0.002   4.22     0.009  0.000  0.022  0.000   0.022  52.74
 22  0.0002   0.0000   0.0002   0.0000      0.000  0.000  0.000  0.000   0.000   1.71     0.004  0.000  0.010  0.000   0.010  55.77
 23  0.0001   0.0000   0.0001   0.0000      0.000  0.000  0.000  0.000   0.000   0.00     0.001  0.000  0.003  0.000   0.003  54.72
 24  0.0000   0.0000   0.0000   0.0000      0.000  0.000  0.000  0.000   0.000   0.00     0.000  0.000  0.001  0.000   0.001  58.80
 25  0.0000   0.0000   0.0000   0.0000      0.000  0.000  0.000  0.000   0.000   0.00     0.000  0.000  0.000  0.000   0.000   0.00
 26  0.0000   0.0000   0.0000   0.0000      0.000  0.000  0.000  0.000   0.000   0.00     0.000  0.000  0.000  0.000   0.000   0.00
 27  0.0000   0.0000   0.0000   0.0000      0.000  0.000  0.000  0.000   0.000   0.00     0.000  0.000  0.000  0.000   0.000   0.00
 28  0.0000   0.0000   0.0000   0.0000      0.000  0.000  0.000  0.000   0.000   0.00     0.000  0.000  0.000  0.000   0.000   0.00
 29  0.0000   0.0000   0.0000   0.0000      0.000  0.000  0.000  0.000   0.000   0.00     0.000  0.000  0.000  0.000   0.000   0.00
 30  0.0000   0.0000   0.0000   0.0000      0.000  0.000  0.000  0.000   0.000   0.00     0.000  0.000  0.000  0.000   0.000   0.00
 31  0.0000   0.0000   0.0000   0.0000      0.000  0.000  0.000  0.000   0.000   0.00     0.000  0.000  0.000  0.000   0.000   0.00
 32  0.0000   0.0000   0.0000   0.0000      0.000  0.000  0.000  0.000   0.000   0.00     0.000  0.000  0.000  0.000   0.000   0.00
 33  0.0000   0.0000   0.0000   0.0000      0.000  0.000  0.000  0.000   0.000   0.00     0.000  0.000  0.000  0.000   0.000   0.00
 34  0.0000   0.0000   0.0000   0.0000      0.000  0.000  0.000  0.000   0.000   0.00     0.000  0.000  0.000  0.000   0.000   0.00
 35  0.0000   0.0000   0.0000   0.0000      0.000  0.000  0.000  0.000   0.000   0.00     0.000  0.000  0.000  0.000   0.000   0.00
 36  0.0000   0.0000   0.0000   0.0000      0.000  0.000  0.000  0.000   0.000   0.00     0.000  0.000  0.000  0.000   0.000   0.00
 37  0.0000   0.0000   0.0000   0.0000      0.000  0.000  0.000  0.000   0.000   0.00     0.000  0.000  0.000  0.000   0.000   0.00
 38  0.0000   0.0000   0.0000   0.0000      0.000  0.000  0.000  0.000   0.000   0.00     0.000  0.000  0.000  0.000   0.000   0.00
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Figure 4. Program QQSEGL, simulation results of runoff quantity and quality.

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****  PIPE RESULTS  ****           PIPE NUMBER    30     UPPER NODE      CO34      LOWER NODE  CO35

INTERVAL        QU         HU        QD         HD        P1          P2          P3          P4
              (L/SEC)     (M)      (L/SEC)     (M)     (KG/INT)    (KG/INT)   (E10C/INT)  (KG/INT)


    1           36.       .00        35.       .01        .92        1.03       73.83        1.33
    2           39.       .00        39.       .01       1.25        1.40      100.13        1.80
    3           43.       .00        42.       .02       1.05        1.18       84.30        1.52
    4          273.       .00       231.       .09       1.31        1.47      104.95        1.89
    5          795.       .00       695.       .27       1.95        2.19      155.07        2.84
    6         1124.       .00      1048.       .41       8.90       10.80      240.00       34.61
    7         1109.       .00      1094.       .43      29.60       40.88      367.45      126.57
    8          964.       .00      1003.       .39      52.03       86.18      535.07      212.89
    9          874.       .00       897.       .35      52.36      117.28      585.34      221.29
   10          750.       .00       776.       .30      45.31      124.50      550.24      199.78
   11          650.       .00       672.       .26      34.01      105.52      484.23      145.59
   12          583.       .00       598.       .23      23.25       83.79      407.98       90.95
   13          547.       .00       556.       .22      18.50       73.12      358.23       64.86
   14          525.       .00       530.       .21      16.43       68.01      312.24       52.00
   15          493.       .00       500.       .20      15.55       66.14      275.11       47.35
   16          451.       .00       460.       .18      15.34       64.98      260.89       45.67
   17          397.       .00       408.       .16      14.93       61.90      254.07       42.27
   18          338.       .00       350.       .14      14.45       56.42      249.16       39.04
   19          281.       .00       294.       .11      14.26       49.47      245.03       38.85
   20          234.       .00       245.       .09      14.31       42.38      246.65       41.31
   21          196.       .00       204.       .08      14.12       35.45      244.08       43.70
   22          172.       .00       178.       .07      14.19       30.71      244.98       46.62
   23          157.       .00       160.       .06      13.90       26.82      243.37       47.54
   24          151.       .00       153.       .06      12.44       22.44      229.52       42.96
   25          146.       .00       147.       .06      10.18       17.94      207.90       34.43
   26          145.       .00       146.       .06       7.58       13.58      185.73       24.07
   27          143.       .00       144.       .06       6.32       11.58      180.42       18.76
   28          143.       .00       143.       .06       6.61       12.49      186.59       19.59
   29          142.       .00       142.       .06       8.06       15.85      212.02       24.50
   30          141.       .00       142.       .06       9.20       18.68      233.47       28.36
   31          141.       .00       141.       .06       8.97       19.01      232.31       27.55
   32          140.       .00       141.       .06       7.63       17.27      217.23       22.84
   33          140.       .00       140.       .05       6.13       14.94      199.81       17.55
   34          139.       .00       139.       .05       4.91       12.58      184.63       13.29
   35          138.       .00       139.       .05       4.13       10.94      176.69       10.45
   36          136.       .00       136.       .05       3.93       11.10      182.72        9.45
   37          130.       .00       131.       .05       4.11       12.57      199.57        9.54
   38          123.       .00       125.       .05       4.07       13.31      211.90        9.02
   39          113.       .00       115.       .05       3.78       12.92      220.38        7.69
   40          104.       .00       106.       .04       3.38       11.68      223.59        6.17
   41           95.       .00        97.       .04       3.09       10.21      224.98        5.11
   42           88.       .00        90.       .04       3.01        9.11      231.13        4.65
   43           81.       .00        83.       .03       3.04        8.01      240.14        4.51
   44           76.       .00        77.       .03       3.27        7.34      261.06        4.75
   45           70.       .00        71.       .03       3.72        7.05      297.89        5.37
```

Figure 5. Program MNTWSP or MRBNSP, single event simulation results of segment.

For basins and pumping stations, the flow and pollutant load variations (Figure 6) are provided for the inflow (QIN, PIN1, PIN2, PIN3, PIN4), outflow (QOT, POT1, POT2, POT3, POT4) and overflow (QOV, POV1, POV2, POV3, POV4). For basins the volumes filled (VOL) and the water depth or pressure head (H) are also provided. For overflows, the inflow (QIN, SZU1, SZU2, SZU3, SZU4, where SZU = PIN), outflow (QOT, SAB1, SAB2, POT3, POT4, where SAB = POT) and overflow figures (QOV, POV1, POV2, POV3, POV4) are listed (Figure 7). In addition, the totals overflowing are summarized at the bottom of the hydrograph tables (QOV, POV1, POV2, POV3 and POV4) in Figure 7.

Note: All flow figures printed are taken from the downstream oriented calculation of the iterative solution method, and the flow depth or pressure head figures printed are taken from the upstream oriented calculation. If an interruption of the iteration process occurs, flow and depth figures may be produced that do not seem to corrrespond conclusively. This situation may often be avoided by subdividing long or voluminous sewer segments, which helps to eliminate a forced termination of the iteration procedure.

Further , the output of the simulation program MNTWKC contains a calculation record that is of no intermediate interest to the user. However, the total runoff of flows and pollutant loads from all the calculation area which is part of this record, may be useful (Figure 8).

As explained in Section 1 of Volume I (Model Description, Testing, and Applications) continuous simulations are necessary to define the separate sewer discharge and combined sewer overflow behavior. The amount of data obtained from such a continuous simulation can be evaluated only by means of statistical analyses. The runoff, discharge, and overflow data obtained by the program MNTWKC and MRBNTC are stored for statistical analysis on internal files.

Statistical Results

Sewer and Receiving Water System Statistics--

For statistical analysis, the program STATCS is employed which organizes and analyzes the storm sewer discharge, combined sewer overflow, and sewer or receiving water runoff data. The output of the program STATCS primarily consists of tables and graphs describing frequency distributions, cumulative frequencies, and frequency duration curves resulting from one- or two-dimensional statistical analyses.

Tabulated frequency distributions and cumulative frequency curves for a one-dimensional statistical analysis are shown in Figure 9. The table heading first specifies the name of the discharge or overflow or the segment in the sewer or receiving water system, and indicates whether the analysis was done on a monthly basis (e.g. EVALUATION FOR JULY) or on an annual basis (EVALUATION FOR YEAR). The heading EVALUATION FOR YEAR always is given if all months simulated per year enter the statistical analysis. This type of heading also applies when a part of the year, e.g. May through September, is simulated. The name of the variable (e.g. DURATION OF OVERFLOW) and the number of the variable (e.g. PROPERTY 1) given in the heading refer to the table of properties for statistical analysis provided in Appendix 5. The

```
         ****  BASIN RESULTS  ****                    BASIN NUMBER         2        NODE   6038

INT    H      VOL    QIN    QOT    QOV     PIN1    PIN2    PIN3    PIN4    POT1    POT2    POT3    POT4    POV1    POV2    POV3    POV4
      (M)  CUB.M  L/SEC  L/SEC  L/SEC    (KG)    (KG)  (E10C)    (KG)    (KG)    (KG)  (E10C)    (KG)    (KG)    (KG)  (E10C)    (KG)

  1   .00     0.     33.    33.    0.     1.9     2.1   153.5     2.8     1.9     2.1   153.5     2.8      .0      .0      .0      .0
  2   .00     0.     38.    38.    0.     1.2     1.3    92.9     1.7     1.2     1.3    92.9     1.7      .0      .0      .0      .0
  3   .00     0.     39.    39.    0.     1.1     1.2    87.4     1.6     1.1     1.2    87.4     1.6      .0      .0      .0      .0
  4   .00     0.    124.   124.    0.      .9     1.0    71.3     1.3      .9     1.0    71.3     1.3      .0      .0      .0      .0
  5   .03    17.    212.   156.    0.     3.1     6.9    64.8    13.0     1.5     3.3    30.4     6.1      .0      .0      .0      .0
  6   .08    40.    234.   156.    0.     4.4    12.2    52.0    20.5     1.8     3.7    38.7     7.9      .0      .0      .0      .0
  7   .13    64.    241.   157.    0.     3.2     9.6    49.7    13.8     2.5     5.5    33.7    11.7      .0      .0      .0      .0
  8   .18    89.    240.   158.    0.     3.8     9.6    77.8    13.8     2.1     4.7    32.8     9.2      .0      .0      .0      .0
  9   .23   114.    241.   159.    0.     9.3    16.7   118.0    37.1     1.9     4.3    34.6     7.9      .0      .0      .0      .0
 10   .27   137.    241.   160.    0.     7.9    13.9    87.8    31.8     2.2     4.4    51.3     8.0      .0      .0      .0      .0
 11   .32   159.    237.   161.    0.     8.2    17.4    89.6    33.4     4.3     6.6    69.6    16.9      .0      .0      .0      .0
 12   .36   178.    232.   162.    0.    12.3    29.9   140.5    51.5     5.4     7.7    76.6    21.6      .0      .0      .0      .0
 13   .39   197.    229.   162.    0.    13.1    36.5   161.8    56.1     4.8     6.7    61.0    19.4      .0      .0      .0      .0
 14   .43   213.    226.   163.    0.    11.7    36.6   164.4    48.9     5.0     8.2    63.1    20.5      .0      .0      .0      .0
 15   .46   231.    224.   164.    0.     9.2    32.7   154.6    36.1     6.2    11.2    78.8    25.5      .0      .0      .0      .0
 16   .49   246.    222.   164.    0.     7.8    30.4   146.9    27.5     7.9    15.3   102.9    32.9      .0      .0      .0      .0
 17   .52   261.    219.   165.    0.     7.4    30.9   141.5    23.7     8.5    18.6   119.2    36.3      .0      .0      .0      .0
 18   .55   276.    216.   166.    0.     7.9    33.6   144.3    24.1     7.9    18.8   121.5    33.2      .0      .0      .0      .0
 19   .58   288.    213.   166.    0.     9.0    38.0   156.2    26.6     7.1    18.3   120.8    28.9      .0      .0      .0      .0
 20   .60   298.    209.   166.    0.    10.3    42.6   177.1    29.2     6.1    17.3   117.8    23.6      .0      .0      .0      .0
 21   .62   308.    205.   167.    0.    11.6    45.6   202.0    31.6     5.3    16.3   113.6    18.6      .0      .0      .0      .0
 22   .63   315.    202.   167.    0.    13.0    46.1   226.8    35.3     5.1    16.6   112.0    16.7      .0      .0      .0      .0
 23   .63   317.    187.   167.    0.    13.9    42.8   244.1    39.7     5.5    18.3   116.5    17.1      .0      .0      .0      .0
 24   .63   317.    168.   167.    0.    13.6    35.8   238.2    41.2     6.1    20.5   124.4    18.4      .0      .0      .0      .0
 25   .63   314.    158.   167.    0.    13.8    31.3   241.7    44.3     6.9    22.9   136.3    20.2      .0      .0      .0      .0
 26   .62   310.    152.   167.    0.    13.6    27.3   240.2    45.6     7.8    25.3   152.9    22.0      .0      .0      .0      .0
 27   .61   305.    149.   167.    0.    12.8    23.7   234.9    43.8     8.7    27.1   173.1    23.8      .0      .0      .0      .0
 28   .60   301.    146.   166.    0.    11.0    19.5   218.6    37.3     9.7    27.1   193.3    26.4      .0      .0      .0      .0
 29   .59   295.    145.   166.    0.     8.6    15.3   197.9    28.0    10.6    25.3   213.9    30.0      .0      .0      .0      .0
 30   .58   290.    144.   166.    0.     6.9    12.4   186.7    20.9    11.2    22.7   227.8    33.3      .0      .0      .0      .0
 31   .57   285.    143.   166.    0.     6.5    12.2   188.6    19.3    11.8    20.7   241.3    37.4      .0      .0      .0      .0
 32   .56   280.    142.   166.    0.     7.5    14.6   206.7    22.6    12.1    16.8   249.4    40.4      .0      .0      .0      .0
 33   .55   273.    142.   165.    0.     8.8    17.6   229.6    26.9    11.8    16.9   250.0    40.4      .0      .0      .0      .0
 34   .54   268.    141.   165.    0.     9.1    18.9   237.6    27.9    10.4    14.4   236.7    35.5      .0      .0      .0      .0
 35   .52   262.    140.   165.    0.     8.2    18.0   228.7    24.8     8.0    11.3   213.3    26.1      .0      .0      .0      .0
 36   .51   256.    140.   165.    0.     6.8    16.0   212.6    19.8     6.5     9.3   203.8    19.7      .0      .0      .0      .0
 37   .50   250.    138.   164.    0.     5.5    13.7   197.8    15.2     6.6     9.8   212.6    19.5      .0      .0      .0      .0
 38   .48   241.    132.   164.    0.     4.9    11.4   180.9    11.4     7.8    12.2   240.0    23.7      .0      .0      .0      .0
 39   .46   231.    128.   164.    0.     4.1    11.2   186.8    10.0     8.8    14.2   262.0    27.0      .0      .0      .0      .0
 40   .44   219.    120.   163.    0.     4.1    12.1   199.2     9.6     8.5    14.5   263.2    25.8      .0      .0      .0      .0
 41   .41   205.    111.   163.    0.     4.2    13.2   213.8     9.4     7.2    13.1   248.9    21.1      .0      .0      .0      .0
 42   .38   189.    103.   162.    0.     4.0    13.2   223.1     8.3     5.6    11.1   231.6    15.5      .0      .0      .0      .0
 43   .34   171.     95.   161.    0.     3.6    12.2   227.2     6.8     4.6     9.7   224.6    11.8      .0      .0      .0      .0
 44   .30   151.     88.   160.    0.     3.3    10.8   228.9     5.6     4.6    10.4   248.6    11.1      .0      .0      .0      .0
 45   .27   133.     81.   160.    0.     3.1     9.7   236.7     5.0     5.0    12.2   287.2    11.2      .0      .0      .0      .0
```

Figure 6. Program MNTWSP, single event simulation results of basin.

TYPING GUIDE SHEET
BEGIN FIRST LINE OF TEXT HERE
CENTER OF PAGE
TOP OF IMAGE AREA
DROPPED HEAD, BEGIN SECTIONS HERE
BEGIN LAST LINE OF TEXT
BOTTOM OF IMAGE AREA OUTSIDE DIMENSION FOR TABLES AND ILLUSTRATIONS
3/8"
PAGE NUMBER
EPA-287 (Cin)
(4-73)

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****  OVERFLOW RESULTS  ****                  OVERFLOW NUMBER        2             NODE      RU28

INTERVAL   QIN      QOT      QOV            SZU1    SZU2    SZU3    SZU4    SAB1    SAB2    POT3    POT4    POV1    POV2    POV3    POV4
        (L/SEC)(L/SEC)(L/SEC)               (KG)    (KG)   (E10C)   (KG)    (KG)    (KG)   (E10C)   (KG)    (KG)    (KG)   (E10C)   (KG)

    1        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
    2        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
    3        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
    4      642.     382.     260.            59.2   146.5   165.0   299.5    35.2    87.1    98.1   175.1    24.0    59.4    66.9   119.5
    5     1904.     248.    1656.           114.4   390.2   488.7   570.3    14.9    44.3    63.6    74.2    99.5   295.9   425.1   496.1
    6     2035.     261.    1774.            92.5   314.1   605.2   438.5    11.9    40.4    77.7    56.3    80.6   273.8   527.4   382.1
    7     1571.     245.    1326.            55.4   204.3   481.4   223.5     8.6    31.9    75.2    34.9    46.7   172.4   406.2   168.6
    8     1190.     244.     946.            42.2   171.2   359.4   123.1     8.6    35.1    72.6    25.2    33.5   136.1   281.8    97.9
    9      835.     245.     590.            30.5   141.7   270.1    74.3     8.9    41.6    79.3    21.8    21.5   100.1   190.8    52.5
   10      551.     243.     308.            18.8    97.8   197.5    41.1     8.3    43.1    87.0    18.1    10.5    54.7   110.4    23.0
   11      426.     241.     186.            11.5    71.1   147.7    17.3     6.5    40.1    83.4     9.8     5.0    30.9    64.3     7.5
   12      298.     237.      61.             7.4    52.4   115.6     4.1     5.9    41.8    92.1     3.3     1.5    10.7    23.5      .8
   13      287.     237.      50.             6.2    41.4    98.7      .8     5.1    34.2    81.5      .7     1.1     7.2    17.2      .1
   14      272.     236.      36.             4.8    30.5    85.3      .6     4.2    26.4    74.0      .5      .6     4.0    11.3      .1
   15      205.     205.       0.             3.3    19.7    67.7      .6     3.3    19.7    67.7      .6      .0      .0      .0      .0
   16      153.     153.       0.             2.2    12.8    55.7      .6     2.2    12.8    55.7      .6      .0      .0      .0      .0
   17       75.      75.       0.             1.3     7.5    47.2      .6     1.3     7.5    47.2      .6      .0      .0      .0      .0
   18       44.      44.       0.              .9     4.5    41.8      .6      .9     4.5    41.8      .6      .0      .0      .0      .0
   19       19.      19.       0.              .7     2.9    38.5      .6      .7     2.9    38.5      .6      .0      .0      .0      .0
   20       12.      12.       0.              .5     1.9    36.9      .6      .5     1.9    36.9      .6      .0      .0      .0      .0
   21        7.       7.       0.              .5     1.2    36.1      .6      .5     1.2    36.1      .6      .0      .0      .0      .0
   22        6.       6.       0.              .4      .8    35.5      .6      .4      .8    35.5      .6      .0      .0      .0      .0
   23        6.       6.       0.              .4      .6    35.1      .6      .4      .6    35.1      .6      .0      .0      .0      .0
   24        6.       6.       0.              .4      .5    34.9      .6      .4      .5    34.9      .6      .0      .0      .0      .0
   25        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   26        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   27        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   28        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   29        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   30        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   31        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   32        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   33        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   34        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   35        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   36        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   37        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   38        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   39        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   40        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   41        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   42        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   43        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   44        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   45        6.       6.       0.              .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0

OVERFLOW TOTALS    QOV     2158.        POV1      325.        POV2     1145.          POV3     2125.          POV4      1368.
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Figure 7. Program MNTWSP, single event simulation results of overflow structure.

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*** EESTOR ***  SINGLE EVENT RESULTS OUT

--- DATENA ---   IRN        1
                 IDTENT     1    1    1 260

*** DATMNA ***  NEW DATE  1   1   1 260

--- RNLOOP ---  EXIT

                                              END-OF-YEAR TOTAL DIRT WASH-OFFS

 DIRT TYPE  1    TOTAL WASH-OFF =   .899986+03    CATCHMENT-AREA WASH-OFFS =   .427920+02   .358686+03   .493593+03   .491520+01

 DIRT TYPE  2    TOTAL WASH-OFF =   .203508+04    CATCHMENT-AREA WASH-OFFS =   .196815+03   .786111+03   .183721+04   .199950+02

 DIRT TYPE  3    TOTAL WASH-OFF =   .636085+04    CATCHMENT-AREA WASH-OFFS =   .502806+03   .280971+04   .300983+04   .385029+02

 DIRT TYPE  4    TOTAL WASH-OFF =   .369765+04    CATCHMENT-AREA WASH-OFFS =   .213960+03   .143474+04   .197929+04   .196608+02

--- RECOVR ---   RECOVERY WRITE CALLED

*** MNTWKC ***  ALARMS O/P FOLLOWS

   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0

WBRKPT  PRINTS
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Figure 8. Program MNTWKC, total runoff of flows and pollutant loads.

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  RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS            PAGE     107

                                                                             NODE:   C037       EVALUATION FOR YEAR
ONE DIMENSIONAL FREQUENCY DISTRIBUTION

DURATION OF OVERFLOW                                   (PROPERTY  1)

SCALES            50.1    100.    150.    200.    250.    300.    350.    400.    450.    500.    550.           MIN
FREQUENCIES       0.00    3.00   11.50    1.50    2.00    0.00    2.00    2.50    1.50    0.00    1.00    0.50
SUM              25.50   25.50   22.50   11.00    9.50    7.50    7.50    5.50    3.00    1.50    1.50    0.50

Q-INFLOW RATE INTERVAL VALUES                          (PROPERTY  3)

SCALES           .100E+00.125    .160    .200    .250    .315    .400    .500    .630    .800    1.00           M3/S
FREQUENCIES     325.50   57.00   64.50   59.50  112.50  138.50  116.50  108.50   61.50   22.50   14.50   25.50
SUM            1106.50  781.00  724.00  659.50  600.00  487.50  349.00  232.50  124.00   62.50   40.00   25.50

Q-INFLOW TOTAL                                         (PROPERTY  4)

SCALES           .150E+04.300E+04.450E+04.601E+04.751E+04.899E+04.105E+05.120E+05.135E+05.150E+05.165E+05    M3
FREQUENCIES       8.00    6.50    2.50    5.00    1.00    1.50    0.00    0.50    0.00    0.00    0.00    0.50
SUM              25.50   17.50   11.00    8.50    3.50    2.50    1.00    1.00    0.50    0.50    0.50    0.50

Q-INFLOW RATE AVERAGE                                  (PROPERTY  5)

SCALES           .400E-01.801E-01.120    .160    .200    .240    .280    .320    .360    .400    .440           M3/S
FREQUENCIES       0.00    0.00    2.00    3.00    3.00    8.00    2.50    2.00    3.00    1.00    0.50    0.50
SUM              25.50   25.50   25.50   23.50   20.50   17.50    9.50    7.00    5.00    2.00    1.00    0.50

Q-INFLOW RATE MAXIMUM                                  (PROPERTY  6)

SCALES            .150    .300    .450    .601    .751    .899    1.05    1.20    1.35    1.50    1.65           M3/S
FREQUENCIES       1.00    1.50    4.00    6.50    4.00    3.00    0.00    2.50    0.50    1.50    0.50    0.50
SUM              25.50   24.50   23.00   19.00   12.50    8.50    5.50    5.50    3.00    2.50    1.00    0.50

P1-INFLOW RATE INTERVAL VALUES                         (PROPERTY 11)

SCALES           .100E-01.200E-01.300E-01.400E-01.500E-01.600E-01.700E-01.800E-01.900E-01.100E+00.110           KG/S
FREQUENCIES     233.50  468.00  129.00   73.00   51.50   38.00   29.00   27.00   16.50   11.50    6.50   23.00
SUM            1106.50  873.00  405.00  276.00  203.00  151.50  113.50   84.50   57.50   41.00   29.50   23.00

P1-INFLOW TOTAL                                        (PROPERTY 12)

SCALES            80.1    160.    240.    320.    400.    480.    560.    640.    720.    800.    880.           KG
FREQUENCIES       0.00    3.50    4.50    6.50    3.50    2.00    2.50    1.00    1.00    0.50    0.00    0.50
SUM              25.50   25.50   22.00   17.50   11.00    7.50    5.50    3.00    2.00    1.00    0.50    0.50
```

Figure 9. Program STATCS, one-dimensional statistics of continuous simulation results, tabularized.

first line, SCALES, gives the division into classes for the variable investigated. The dimension of the values always is indicated on the right side. The center line shows the frequency distribution for all months or years investigated. The last value of this line indicates the number of events exceeding the last scale value given. In Figure 9, overflow durations of 50 to 100 minutes were encountered three times per year and an overflow duration of 550 minutes was exceeded once in two years. The lower line, named SUM, represents the corresponding cumulative frequency curve. It is obtained by summarizing the individual frequencies of the frequency distribution from the right side. Figure 10 demonstrates the corresponding graphical output of the frequency distribution (***) and the cumulative frequency curve (XX). From the cumulative frequency curve it can be read that for the time span investigated an overflow duration of 350 minutes was exceeded five times during a year on the average.

Two-dimensional frequency distributions are given as tabulated and graphical outputs (Figures 11 and 12) as well. The two variables or properties represented in the example are duration of overflow and average inflow rate. The column headings of Figure 11 include the node, discharge or overflow name in the sewer or receiving water system, type of statistics (monthly or annual), names and numbers of the properties investigated, and the dimensions of the vertical and horizontal scales. The first column of figures on the left hand provides the scale of the property listed vertically and the top line gives the scale of the property listed horizontally. The values given in the center of the tabulation represent the number of events occurring within the ranges indicated by the scales.

Figure 11 shows, for instance, that three events occurred for which the duration of overflow was between 100 and 150 minutes when the average inflow rate was about 0.18 m^3/s.

As for one-dimensional results frequency distributions and cumulative frequency curves of the two properties investigated for two-dimensional statistics, can be provided. The columns on the right hand side of Figure 11 refer to the first property and the two lines at the bottom refer to the second property. For both of these external sets the inner columns or lines are the frequency distributions and the outer are the cumulative frequency curves.

Figure 12 attempts to show graphically the isolines for certain frequencies. The heading again is similar to that for the tabulated output of Figure 11. The scales of the two properties investigated are provided on the left and at the bottom of the graph. The three different frequency ranges for which different characteristics are plotted were specified in the input. The grid system, however, is usually too coarse to provide a picture sufficiently dense to connect the isolines for given frequencies.

In addition to the statistical analysis for each location point investigated, monthly and annual totals also are listed by STATCS (Figure 13). Similarly, as for single event simulations, for continuous simulations the program MNTWKC gives the calculation record of the total flow and pollutant

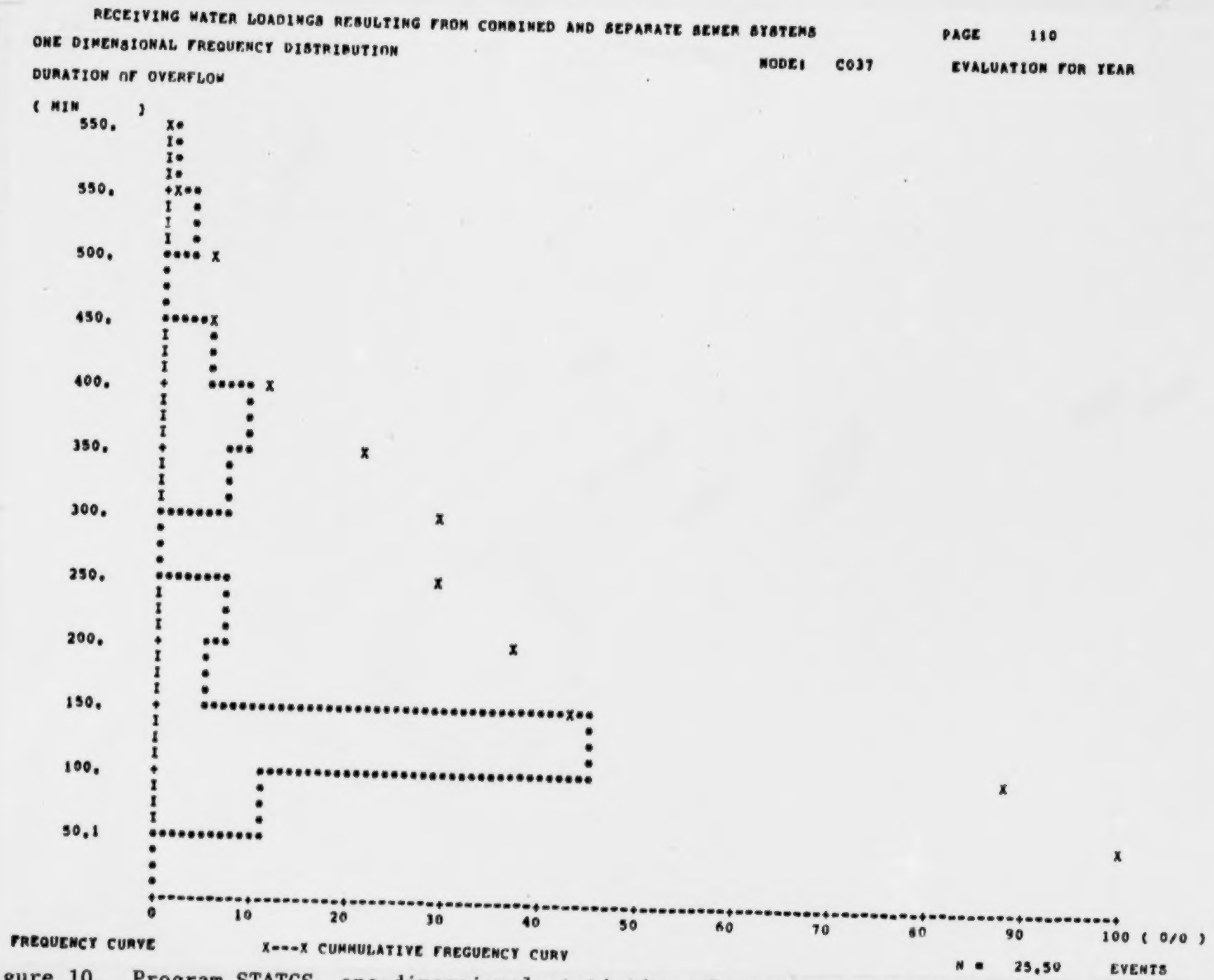


Figure 10. Program STATCS, one-dimensional statistics of continuous simulation results, graphical.

```
 RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS            PAGE     103

                                                                     NODE:   C037       EVALUATION FOR YEAR
TWO DIMENSIONAL FREQUENCY DISTRIBUTION

DURATION OF OVERFLOW
Q-INFLOW RATE AVERAGE                                   (PROPERTY  1)     (MIN      )        VERTICAL SCALE
                                                        (PROPERTY  5)     (M3/S     )        HORIZONTAL SCALE
 FREQUENCY IN   EVENTS

             I
             I  .400E-01.801E-01.120   .160   .200   .240   .280   .320   .360   .400   .440          I
             I                                                                                        I
---------------------------------------------------------------------------------------------------------------------
             I
             I   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00 I
     50.05   I                                                                                        I   0.00  25.50
             I   0.00   0.00   2.00   1.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00 I
    100.10   I                                                                                        I   3.00  25.50
             I   0.00   0.00   0.00   2.00   3.00   5.50   0.50   0.50   0.00   0.00   0.00   0.00 I
    150.15   I                                                                                        I  11.50  22.50
             I   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   1.50   0.00   0.00   0.00 I
    200.20   I                                                                                        I   1.50  11.00
             I   0.00   0.00   0.00   0.00   0.00   0.00   0.50   0.50   0.00   1.00   0.00   0.00 I
    250.25   I                                                                                        I   2.00   9.50
             I   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00 I
    299.75   I                                                                                        I   0.00   7.50
             I   0.00   0.00   0.00   0.00   0.00   0.00   0.50   1.00   0.50   0.00   0.00   0.00 I
    349.80   I                                                                                        I   2.00   7.50
             I   0.00   0.00   0.00   0.00   0.00   1.50   0.00   0.00   0.50   0.00   0.50   0.00 I
    399.85   I                                                                                        I   2.50   5.50
             I   0.00   0.00   0.00   0.00   0.00   0.50   0.50   0.00   0.00   0.00   0.00   0.50 I
    449.90   I                                                                                        I   1.50   3.00
             I   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00 I
    499.95   I                                                                                        I   0.00   1.50
             I   0.00   0.00   0.00   0.00   0.00   0.00   0.50   0.00   0.50   0.00   0.00   0.00 I
    550.00   I                                                                                        I   1.00   1.50
             I   0.00   0.00   0.00   0.00   0.00   0.50   0.00   0.00   0.00   0.00   0.00   0.00 I
             I                                                                                        I   0.50   0.50
---------------------------------------------------------------------------------------------------------------------
             I                                                                                        I
             I   0.00   0.00   2.00   3.00   3.00   8.00   2.50   2.00   3.00   1.00   0.50   0.50 I
             I                                                                                        I
             I  25.50  25.50  25.50  23.50  20.50  17.50   9.50   7.00   5.00   2.00   1.00   0.50 I
             I                                                                                        I
```

Figure 11. Program STATCS, two-dimensional statistics of continuous simulation results, tabularized.

```
     RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS            PAGE     104

                                                                        NODE:   C037       EVALUATION FOR YEAR
   TWO DIMENSIONAL FREQUENCY DISTRIBUTION

   DURATION OF OVERFLOW                                   (PROPERTY  1)      (MIN     )       VERTICAL SCALE
   Q-INFLOW RATE AVERAGE                                  (PROPERTY  5)      (M3/S    )       HORIZONTAL SCALE

          I
  550,00  +  *       *       *       *       *       X       *       *       *       *       *       *
          I
          I
  550,00  +  *       *       *       *       *       *       X       *       X       *       *       *
          I
          I
  499,95  +  *       *       *       *       *       *       *       *       *       *       *       *
          I
          I
  449,90  +  *       *       *       *       *       X       X       *       *       *       *       X
          I
          I
  399,85  +  *       *       *       *       *       X       *       *       X       *       X       *
          I
          I
  349,80  +  *       *       *       *       *       *       X       X       X       *       *       *
          I
          I
  299,75  +  *       *       *       *       *       *       *       *       *       *       *       *
          I
          I
  250,25  +  *       *       *       *       *       *       X       X       *       X       *       *
          I
          I
  200,20  +  *       *       *       *       *       *       *       *       X       *       *       *
          I
          I
  150,15  +  *       *       *               *       *       X       X       *       *       *       *
          I
          I
  100,10  +  *       *               X       *       *       *       *       *       *       *       *
          I
          I
   50,05  +  *       *       *       *       *       *       *       *       *       *       *       *
          I
          ----+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+------

           .400E-01,801E-01,120    .160    .200    .240    .280    .320    .360    .400    .440    .440


                                                               *** :  ISOLINES FOR FREQUENCY OF          0,25
                                                               XXX :  ISOLINES FOR FREQUENCY OF          1,00
                                                               ... :  ISOLINES FOR FREQUENCY OF          5,00
```

Figure 12. Program STATCS, two-dimensional statistics of continuous simulation results, graphical.

TYPING GUIDE SHEET
BEGIN FIRST LINE OF TEXT HERE
DROPPED HEAD: BEGIN SECTIONS HERE
CENTER OF PAGE
TOP OF IMAGE AREA
BEGIN LAST LINE OF TEXT
BOTTOM OF IMAGE AREA OUTSIDE DIMENSION FOR TABLES AND ILLUSTRATIONS
PAGE NUMBER
EPA-287 (Cin.) (4-76)

```
RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SENER SYSTEMS          PAGE      4

                                 NODE:   R015

                                     1. YEAR

        1.MONTH   2.MONTH   3.MONTH
  1   .1924E+04 .8865E+04 .1666E+04
  2   .1817E+03 .5887E+03 .1962E+03
  3   .4437E+03 .1290E+04 .3727E+03
  4   .1894E+04 .8677E+04 .2051E+04
  5   .7375E+03 .2595E+04 .9267E+03

                                 TOTAL FOR WHOLE YEAR

                                    1    .1246E+05
                                    2    .9667E+03
                                    3    .2106E+04
                                    4    .1262E+05
                                    5    .4259E+04

                                     2. YEAR

        1.MONTH   2.MONTH   3.MONTH
  1   .2802E+04 .2741E+04 .1837E+04
  2   .1631E+03 .1835E+03 .1582E+03
  3   .4503E+03 .5017E+03 .3022E+03
  4   .2133E+04 .2371E+04 .2556E+04
  5   .6693E+03 .7300E+03 .6496E+03

                                 TOTAL FOR WHOLE YEAR

                                    1    .7379E+04
                                    2    .5048E+03
                                    3    .1254E+04
                                    4    .7061E+04
                                    5    .2049E+04

             TOTAL FOR ALL YEARS                                        AVERAGE YEARLY VALUE

       1            .1983E+05                                                     .9917E+04
       2            .1471E+04                                                     .7357E+03
       3            .3360E+04                                                     .1680E+04
       4            .1968E+05                                                     .9841E+04
       5            .6308E+04                                                     .3154E+04
```

Figure 13. Program STATCS, monthly and annual totals.

runoff from the whole calculation area over the time span simulated (Figure 8).

Precipitation Statistics--

In principal, the output of the precipitation statistics program RAINSC is similar to the sewer and receiving water system statistics output of the program STATCS. However, RAINSC allows only for one-dimensional statistics of the properties indicated in Appendix 5 (part: Properties for Statistical Analysis of Precipitation Data). Here the scales are always linear and are automatically chosen by the program based on the maximum value detected. The scales are automatically subdivided into ten ranges. In addition, a statistical analysis is carried out where scales are automatically chosen so that 50 percent of the values are contained in the nine lower scale ranges. Thus it is possible to detail the frequency distribution for the usually more frequently occurring lower values.

Figure 14 shows an output example. The headings specify the property under consideration and the scale dimension and indicate whether the analysis is based on monthly or annual data. Each property specification is followed by two tables for the two scale divisions chosen in each case. The first line of each grouping gives the scale divisions, and the first value in this line belongs to the range from 0 to the first scale value given. The second line in each group gives the frequencies for the individual ranges. The third line provides the cumulative frequency curve and the last line gives the percentage of values occurring within the individual ranges. In this instance, a rainfall duration between 462 and 528 minutes was encountered once in two years.

```
ONE DIMENSIONAL FREQUENCY DISTIBUTION

YEARS STATISTICS FOR THE YEARS

56 60
RAINFALL DURATION  ( MIN )

SCALE          66     132     198     264     330     396     462     528     594     660
FREW.          27       5       3       4       1     1.5       0      .5       0      .5
TOTALS       42.5    15.5    10.5     7.5     3.5     2.5       1       1      .5      .5
TOT. PC.      100   36.47   24.71   17.65    8.24    5.88    2.35    2.35    1.18    1.18

DT. SCAL      6.6    13.2    19.8    26.4      33    39.6    46.2    52.8    59.4      66
FREQ.           0       2       6     6.5     3.5     2.5     2.5       0     2.5     1.5
TOTALS       42.5    42.5    40.5    34.5      28    24.5      22    19.5    19.5      17
TOT. PC.      100     100   95.29   81.18   65.88   57.65   51.76   45.88   45.88      40


DRYSPELL  ( MIN )

SCALE        2000    4000    6000    8000   10000   12000   14000   16000   18000   20000
FREQ.        18.5     6.5     4.5     4.5       2     1.5      .5       2       1     1.5
TOTALS       42.5      24    17.5      13     8.5     6.5       5     4.5     2.5     1.5
TOT. PC.      100   56.47   41.18   30.59      20   15.29   11.76   10.59    5.88    3.53

DT. SCAL      400     800    1200    1600    2000    2400    2800    3200    3600    4000
FREQ.         8.5     1.5     3.5       4       1       2      .5       2     1.5      .5
TOTALS       42.5      34    32.5      29      25      24      22    21.5    19.5      18
TOT. PC.      100      80   76.47   68.24   58.82   56.47   51.76   50.59   45.88   42.35


TOTAL RAINDEPTH PER EVENT  ( MM )

SCALE         3.3     6.6     9.9    13.2    16.5    19.8    23.1    26.4    29.7      33
FREQ.          14      16       6       3       2      .5      .5       0       0      .5
TOTALS       42.5    28.5    12.5     6.5     3.5     1.5       1      .5      .5      .5
TOT. PC.      100   67.06   29.41   15.29    8.24    3.53    2.35    1.18    1.18    1.18

DT. SCAL      .66    1.32    1.98    2.64     3.3    3.96    4.62    5.28    5.94     6.6
FREQ.           0       2     4.5       4     3.5     2.5     4.5     3.5     2.5       3
TOTALS       42.5    42.5    40.5      36      32    28.5      26    21.5      18    15.5
TOT. PC.      100     100   95.29   84.71   75.29   67.06   61.18   50.59   42.35   36.47


AVERAGE INTENSITY PER RAINFALL EVENT  ( MM / 1000 / INT )

SCALE  .      270     540     810    1080    1350    1620    1890    2160    2430    2700
FREQ.         9.5      15      10     4.5      .5       1      .5      .5      .5      .5
TOTALS       42.5      33      18       8     3.5       3       2     1.5       1      .5
TOT. PC.      100   77.65   42.35   18.82    8.24    7.06    4.71    3.53    2.35    1.18

DT. SCAL       54     108     162     216     270     324     378     432     486     540
FREQ.           0       1       4     2.5       2     5.5       2       3       2     2.5
TOTALS       42.5    42.5    41.5    37.5      35      33    27.5    25.5    22.5    20.5
TOT. PC.      100     100   97.65   88.24   82.35   77.65   64.71      60   52.94   48.24
```

Figure 14. Program RAINSC, precipitation statistics.

SECTION 2

INITIAL JOB SET-UP

COMPUTER SYSTEM REQUIREMENTS

The QQS program package can be run on machines with core storage capacities of at least 122 K words using overlay. The program also requests peripheral storage devices which may consist of direct accessable disk or drum units. All programs of the QQS package were executed on three machine types, i.e., UNIVAC series 1100 with EXEC 8 operating systems, DEC series 20 with TOPS 20 operating systems and AMDAHL 470/V7 with IBM OS/VS1 operating systems.

SYSTEM DEPENDENT ROUTINES

Except for program DTCHCK all programs of the QQS package are written in ANSI X3.9 FORTRAN. The complete package consist of approximately 30,000 statements. The program DTCHCK does not correspond to ANSI FORTRAN on three occasions:

- literal phrases enclosed in apostrophes are used in FORMAT statements
- READ statements are used with ERR jump
- READ statements are used with END jump

For direct access I/O and for character set handling, machine dependent routines, written in assembler language, are employed. The direct access I/O is made from the subroutine DIRECT:

```
CALL DIRECT (IFILE, IOSW, MEM, NWORDS, IREC)
```

The arguments are:

IFILE	Integer variable or constant which defines a file name (up to four characters)
IOSW	I/O switch 8 for write on file 16 for read from file
MEM	Integer or real variable or array element corresponding to the beginning address after which it is read from memory or written on to memory
NWORDS	Number of words to be transferred
IREC	Starting record consisting at 28 words on the file from which it is read or on to which it is written.

For the character string handling two routines are used: Integer function IGET and subroutine PUT. They are called as follows:

CALL PUT (ISTRNG, NTH, ICHAR)
i.e., put the character ICHAR into ISTRNG at the position NTH.

ICHAR = IGET (ISTRNG, NTH)
i.e., get the NTH character from string ISTRNG.

JOB CONTROL LANGUAGE

The job control cards are provided for all programs of the package according to the requirements of the UNIVAC series 1100 machines in Section 3, Program Handling of this report. The logical unit number for the card reader is 5 and for the line printer is 6.

DATA SETS

The data sets or files used by the QQS program package can be classified into two groups: the sequential data sets and the direct access files. The sequential data sets are read or written formated or unformated from FORTRAN subroutines. They are accessed via logical unit numbers. The direct access files are read or written from the machine dependent routine DIRECT, and accessed, e.g. at UNIVAC by a file name which can consist of a maximum of four characters. The names of main programs, subroutines or block data subprograms in which the logical unit numbers and file names for the direct access files are defined in Table 2.

TABLE 2. COORDINATION OF LOGICAL UNIT NUMBERS AND FILE NAMES

Main program	Names of main program, subroutines or block data subprograms, where logic unit numbers and file names are defined
DTCHCK	INCNDC
DWTFLC	DWTFLC
MNTWKC	CNINIT
MNTWSP	INCMNP
MRBNSP	INCMBP
MRBNTC	CNINVN
QQSEGL	QQSEGL
RAINSC	INCNRS
RCVRIN	RCVRIN
STATCS	INISYS
TEXTFC	TEXTFC
TXTFCE	TXTFCE
TXTFCG	TXTFCG

In Table 3 the logical unit numbers for all sequential files used by the QQS program package are provided and an estimate for their size in tracks is given. 1 track corresponds to 1,792 words.

TABLE 3. LOGICAL UNIT NUMBERS FOR SEQUENTIAL FILES AND THEIR SIZES

File	Logical unit number	Size in tracks
IF01	11	10
IF02	12	20
IF03	13	100
IF05	15	10
IF06	16	10
IF07	17	10
IF08	18	10
IF09	19	10
IF10	20	10
IF11	21	10
IF12	22	10
IF14	24	10
IF17	27	50
IF27	7a)	20
IF28	8a)	20
NETb)	5	50
QUANTb)	3	50
QUALTb)	4	50
RAIN	2b), 11c)	50
MRBNETd)	5	50
MRBQNTd)	3	50
MRBQLTd)	4	50

a) Used only by program STATCS
b) Used only by program DTCHCK for sewer network calculation
c) Used only by program RAINSC
d) Used only by program DTCHCK for receiving water calculation

Table 4 contains the direct access files used by the QQS program package and their sizes in tracks. The sizes are estimated for a continuous simulation of approximately ten years of precipitation input with high intensities and frequent rainfalls.

LOADING PROCEDURES

In order to run the program on a computer with a maximum core size corresponding to the minimum core requirements given, some programs have to be segmented. Programs requiring block data subprograms are listed in Table 5.

TABLE 4. DIRECT ACCESS FILES AND THEIR SIZES

File	Size in tracks		
IF04	10a)c)d)	6000b)	
IF13	1200a)b)	10c)d)	
IF15	100a)	1200b)	10e)
IF16	200a)	2400b)	10e)
IF18	10a)c)	8000b)d)	
IF19	10a)c)	300b)d)	
IF20	1200a)b)	10c)d)	
IF21	600a)b)	10c)d)	
IF22	10a)c)d)	300b)	
IF23	1500a)	10b)c)d)	
IF24	10a)b)d)	1000c)	
IF25	20		
IF26	20		
DRAI	50f)		
11	50g)		
9	8000g)		
TFRS	20h)		
FIRS	500i)		
FRRS	500i)		

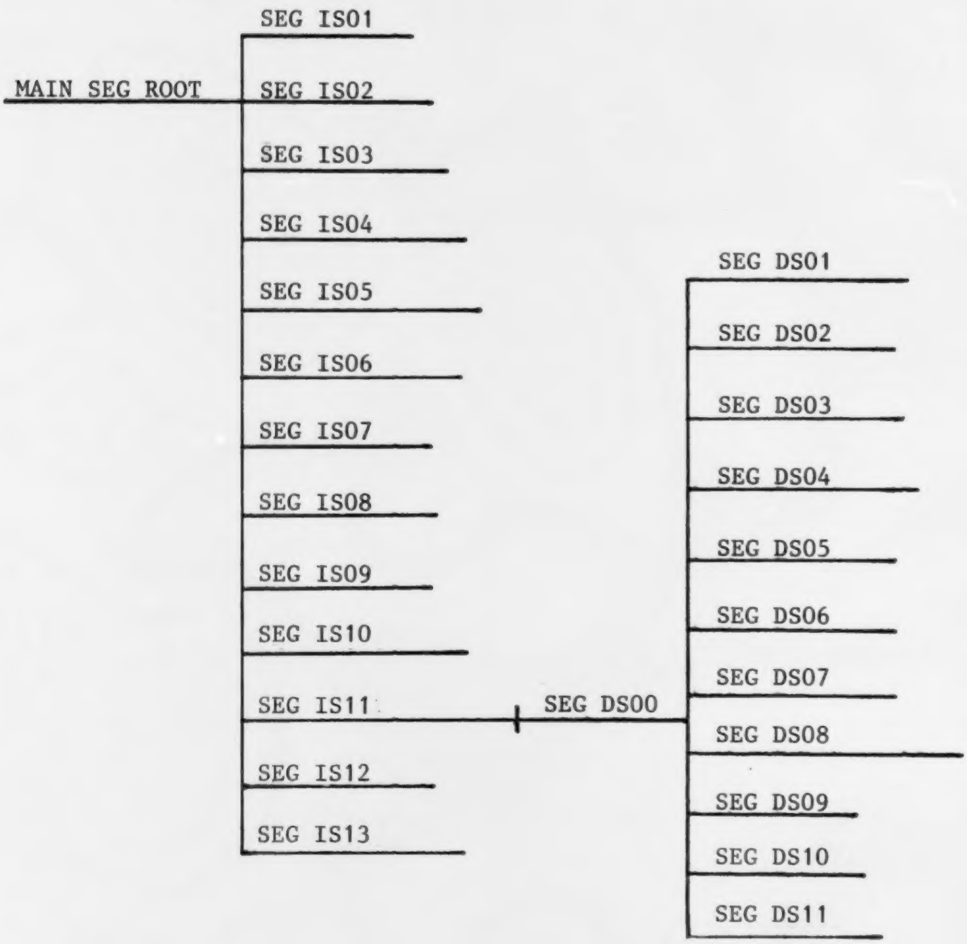
a) for sewer network and single event calculation
b) for sewer network and continuous simulation
c) for receiving water network and single event calculation
d) for receiving water network and continuous simulation
e) for sewer network calculated only
f) scratch file used by program DTCHCK only
g) scratch file used by program STATCS only
h) text file used by program RAINSC only
i) scratch file used by program RAINSC only

TABLE 5. PROGRAMS WITH BLOCK DATA SUBPROGRAMS

Program	Block data subprograms
DTCHCK	INCNDC
MNTWKC	CNINIT
MNTWSP	INCMNP
MRBNSP	INCMBP
MRBNTC	CNINVN
RAINSC	INCNRS

The following tables 6 to 10 describe the overlay structures of the programs DTCHCK, DWTFLC, MNTWKC, MRBNTC and STATCS. The beginning of a segment is marked by the name SEG. The following lines include all programs, subroutines and block data subprograms belonging to this particular segment. At the end all common blocks of this segment are included, shifted two blanks to the right in the tables.

TABLE 6. OVERLAY STRUCTURE OF THE PROGRAM DTCHCK


MAIN SEG ROOT
SEG IS01
SEG IS02
SEG IS03
SEG IS04
SEG IS05
SEG IS06
SEG IS07
SEG IS08
SEG IS09
SEG IS10
SEG IS11
SEG IS12
SEG IS13
SEG DS00
SEG DS01
SEG DS02
SEG DS03
SEG DS04
SEG DS05
SEG DS06
SEG DS07
SEG DS08
SEG DS09
SEG DS10
SEG DS11

(continued)

TABLE 6 (continued)

```
 SEG  ROOT
   IN  DTCHCK
   IN  INCNDC
 BLANK$COMMON
      IN  CONVER
      IN  FILESN
      IN  GEBANZ
      IN  HULRTH
      IN  INTANZ
      IN  KNOANZ
      IN  RHBANZ
      IN  RORANZ
      IN  RUEANZ
      IN  SHMANZ
      IN  SHMUZV
      IN  STEANZ
      IN  STEUER
 SEG  IS01*,  (ROOT)
   IN  INPUTA
   IN  MINPUT
 SEG  IS02*,  (ROOT)
   IN  INPUTR
 SEG  IS03*,  (ROOT)
   IN  INPUTC
 SEG  IS04*,  (ROOT)
   IN  INPUTD
 SEG  IS05*,  (ROOT)
   IN  INPUTE
 SEG  IS06*,  (ROOT)
   IN  INPUTF
 SEG  IS07*,  (ROOT)
   IN  QUANT1
   IN  MQUANT
 SEG  IS08*,  (ROOT)
   IN  QUANT2
 SEG  IS09*,  (ROOT)
   IN  QUANT3
 SEG  IS10*,  (ROOT)
   IN  QUANT4
 SEG  IS11*,  (ROOT)
   IN  DIRECT
   IN  REGEN
   IN  REGFIL
 SEG  IS12*,  (ROOT)
   IN  QUALI1
   IN  MQUALT
 SEG  IS13*,  (ROOT)
   IN QUALI2
 SEG  DS00*,  (IS01,IS02,IS03,IS04,IS05,IS06,IS07,IS08,IS09,IS10,IS11,IS12,IS13)
   IN  GEBIET
   IN  INTKNO
   IN  KNODAT
   IN  PHBDAT
   IN  RORDAT
   IN  RUEDAT
   IN  SHMUZA
   IN  STEUEL
   IN  TWACMN
   IN  WASSVB
 SEG  DS01*,  (DS00)
     IN  CDCK01
     IN  CDCK06
 SEG  DS02*,  (DS00)
     IN  CDCK02
```

```
SEG  DS03*,  (DS00)
    IN  CDCK03
SEG  DS04*,  (DS00)
    IN  CDCK04
SEG  DS05*,  (DS00)
    IN CDCK05
SEG  DS06*,  (DS00)
    IN  CDCK07
    IN  CDCK09
SEG  DS07*,  (DS00)
    IN  CDCK08
    IN  CDCK11
SEG  DS08*,  (DS00)
    IN  CDCK10
SEG  DS09*,  (DS00)
    IN  CDCK12
SEG  DS10*,  (DS00)
    IN  CDCK13
SEG  DS11*,  (DS00)
    IN  CDCK14
    IN  CDCK15
    IN  CDCK16
    IN  REGADC
END
```

TABLE 7. OVERLAY STRUCTURE OF THE PROGRAM DWTFLC

```
SEG  ROOT
  IN  DWTFLC
     IN  ALLGCD
     IN  ANZLHN
     IN  BLANK$COMMON
     IN  CNSCHN
     IN  EXKRHN
     IN  EXVBHN
     IN  FADONT
     IN  FILENR
     IN  FILERC
     IN  ITBWRT
     IN  IWMAHN
     IN  KNOTHN
     IN  QZQUDV
     IN  RHBKHN
     IN  RHBNHN
     IN  RHNVHN
     IN  RHRKHN
     IN  RHRNHN
     IN  RHRVHN
     IN  ROHRHN
     IN  RUEFHN
     IN  SIKKHN
     IN  STELHN
     IN  STEVHN
     IN  SYSDHN
     IN  TWADTN
     IN  TWDRHN
     IN  ZETIDL
SEG  DTE*
   IN  DTENTW
   IN  INDATW
   IN  IVZIHN
SEG  TWA*  ,  DTE
   IN  DIRECT
   IN  ECVZHN
   IN  EMXHBT
   IN  IWSEHN
   IN  PMXHBT
   IN  SB1IHN
   IN  SB4IHN
   IN  SHARHN
   IN  SINKBF
   IN  SINKBW
   IN  SRFAHN
   IN  SRHAHN
   IN  SRKRHN
   IN  SRNKHN
   IN  SRRBHN
   IN  SRRGHN
   IN  SRRIHN
   IN  SRVZHN
   IN  TWARHN
   IN  TWKTHN
   IN  WNUBHN
      IN  CEHAHN
      IN  ITERTN
      IN  SIKVHN
      IN  STVAHN
      IN  STVVHN
```

```
SEG  INW*  (TWA)
   IN  IB1IHN
   IN  IB4IHN
   IN  INWTHN
   IN  IWRBHN
   IN  IWRIHN
   IN  IWRUHN
   IN  IWVZHN
SEG  VRR*  ,  INW
   IN  ECSFHN
   IN  EHOAHN
   IN  EHARHN
   IN  EHASHN
   IN  ENHAHN
   IN  ENHBHN
   IN  EQAAHN
   IN  EQARHN
   IN  EQHAHN
   IN  EQHBHN
   IN  EQHRHN
   IN  EQRAHN
   IN  ERHAHN
   IN  ERQEHN
   IN  EVLBHN
   IN  KNTRAD
   IN  LQARHN
   IN  LQNAHN
   IN  LQNRHN
   IN  OPBLQS
   IN  QNBFTW
   IN  RB1IHN
   IN  RB4IHN
   IN  RRFAHN
   IN  RRNKHN
   IN  RRRBHN
   IN  RRRGHN
   IN  RRRIHN
   IN  RRRUHN
   IN  RRVZHN
   IN  RUKRHN
   IN  TWKBHN
   IN  VB4IHN
   IN  VORRHN
   IN  VRARHN
   IN  VRASHN
   IN  VRNKHN
   IN  VRRBHN
   IN  VRRGHN
   IN  VRRIHN
   IN  VRVZHN
      IN  CEQEHN
      IN  CHOAHN
      IN  CQARHN
      IN  CQD2HN
      IN  QZQUDA
END
```

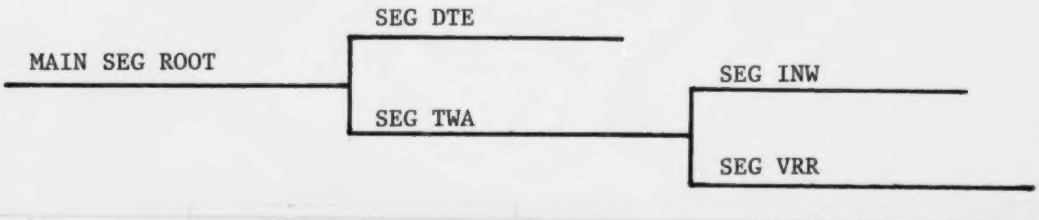


TABLE 8. OVERLAY STRUCTURE OF THE PROGRAM MNTWKC

```
SEG MAIN
   IN  MNTWKC
   IN  CNINIT
   IN  BENTOP
   IN  CLOSED
   IN  CLOSES
   IN  DATENA
   IN  DATMNS
   IN  DIRECT
   IN  MESSBN
   IN  MSENBN
   IN  SBNTOP
   IN  SCHBEL
   IN  SSTUP3
   IN  SSTUP4
   IN  SSTUP6
   IN  STUPD3
   IN  STUPD4
   IN  STUPD5
   IN  STUPD6
   IN  SWARN
   IN  THBFRD
      IN  ALARMS
      IN  ALLGCD
      IN  ANZLHN
      IN  AUSDRK
      IN  BLANK$COMMON
      IN  CONSCM
      IN  FILENR
      IN  FILERC
      IN  ITBWRT
      IN  MAINCM
      IN  OFBBEL
      IN  SIKKHN
      IN  SMALLG
      IN  SMCONB
      IN  SSTTS1
      IN  SSTTS2
      IN  STATS1
      IN  STATS2
      IN  SYSDHN
      IN  TWDRHN
      IN  ZEITDL
SEG HAUPT*,(MAIN)
   IN  BASPA1
   IN  BASPB1
   IN  BASPB2
   IN  BASPC1
   IN  BASPC2
   IN  BASPI1
   IN  BASPI2
   IN  BASPL1
   IN  BASPL2
   IN  BSTKHN
   IN  BUFGET
   IN  BUFREL
   IN  CONSOL
   IN  CURTMP
   IN  DATHNA
   IN  DATHNI
   IN  DATHNL
   IN  DIRTHQ
   IN  DIRTT
   IN  DTENHN
   IN  DTSET
   IN  ECVZHN
   IN  EEINIT
   IN  EESRHB
   IN  EESRUE
   IN  EESTOH
   IN  EFNGER
   IN  EHOAHN
   IN  EHARHN
   IN  EHASHN
   IN  ENHAHN
   IN  ENHBHN
   IN  ENTFHN
   IN  EQAAHN
   IN  EQARHN
   IN  EQHAHN
   IN  EQHBHN
   IN  EQHRHN
   IN  EQRAHN
   IN  ERHAHN
   IN  ERQEHN
   IN  EVLBHN
   IN  FADBHN
   IN  FEDHIS
   IN  FEGDIN
   IN  HNCNIN
   IN  HYDRHN
   IN  INDAHN
   IN  INITHN
   IN  INITMK
   IN  INITTS
   IN  INSEHN
   IN  IPIOBL
   IN  IVZIHN
   IN  JAHRES
   IN  JAHRKO
   IN  KBNTWA
   IN  KBRMNG
   IN  KNTRAD
   IN  LQARHN
   IN  LQNAHN
   IN  LQNRHN
   IN  MRKCHN
   IN  OFB
   IN  OPBLOS
   IN  PIPEPA
   IN  PIPEPB
   IN  PIPEPC
   IN  PIPEPI
   IN  PIPEPL
   IN  POLYSO
   IN  QNBFHN
   IN  RAINTR
   IN  RB11HN
   IN  RB4IHN
   IN  RBINIT
   IN  RBUPD1
   IN  RBUPD2
   IN  RDRNST
   IN  RDVEBK
   IN  RECOVS
   IN  REPOSR
   IN  RHBHQ
   IN  RNLOOP
```

(continued)

TABLE 8 (continued)

```
IN  RRFAHN
IN  RRNKHN
IN  RRRBHN
IN  RRRGHN
IN  RRRIHN
IN  RRRUHN
IN  RRVZHN
IN  RSET
IN  RUKRHN
IN  SC1
IN  SHMEGL
IN  SMNIVB
IN  SMRSET
IN  SMUUIN
IN  SSTTRS
IN  SSTUP2
IN  STATRS
IN  STS1HN
IN  STS2HN
IN  STSEHN
IN  STUPD1
IN  STUPD2
IN  SWMGER
IN  TWAINT
IN  VB1IHN
IN  VB4IHN
IN  VORRHN
IN  VORUPD
IN  VRARHN
IN  VRASHN
IN  VRNKHN
IN  VRRBHN
IN  VRRGHN
IN  VRRIHN
IN  VRRUHN
IN  VRVZHN
IN  WNUBHN
  IN  CEHAHN
  IN  CEQEHN
  IN  CHGAHN
  IN  CMSCHN
  IN  CQARHN
  IN  CQD2HN
  IN  CVZVHN
  IN  EXKBHN
  IN  EXVBHN
```

```
    IN  ITERTN
    IN  IWSVHN
    IN  LOGIC
    IN  QZQUDV
    IN  RHRKHN
    IN  SMOVHN
    IN  STEVHN
    IN  STVVHN
    IN  VRSVHN
    IN  FADQNT
    IN  IWMAHN
    IN  IWSAHN
    IN  KNOTHN
    IN  KUVEXB
    IN  NDSDTN
    IN  QZQUDA
    IN  RHBKHN
    IN  RHBNHN
    IN  RHBVHN
    IN  RHRNHN
    IN  RHRVHN
    IN  ROHRHN
    IN  RUEFHN
    IN  SIKVHN
    IN  SHOAHN
    IN  SMROHR
    IN  SMSRWD
    IN  STELHN
    IN  STVAHN
    IN  TWADHN
    IN  VRSAHN
    IN  WMERND
SEG RESTRT*,(MAIN)
  IN  RECOVA
  IN  RECOVC
  IN  RECOVR
  IN  RECOVW
    IN  RECVRY
SEG STATOP*,(MAIN)
  IN  STATHD
  IN  SSTTHD
END
```

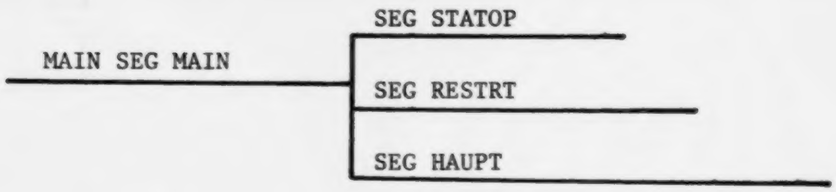


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TABLE 9. OVERLAY STRUCTURE OF THE PROGRAM MRBNTC

```
SEG  MAIN
  IN  MRBNTC
  IN  CNINVN
  IN  DIRECT
  IN  EEINVN
  IN  MSGEVN
  IN  MSGGVN
  IN  STU1VN
  IN  STU3VN
  IN  STU4VN
  IN  STU5VN
  IN  STU6VN
  IN  STU7VN
  IN  SWRNVN
  IN  THBFVN
    IN  BLANK$COMMON
    IN  ALRHVN
    IN  ALGDVN
    IN  ANZLVN
    IN  AUDKVN
    IN  FLNRVN
    IN  FLRCVN
    IN  LOGCVN
    IN  MNCHVN
    IN  QZQUVN
    IN  SHALVN
    IN  SHCOVN
    IN  STT1VN
    IN  STT2VN
    IN  SYSDVN
    IN  FORFNV
    IN  ZETDVN
SEG  VORF* ,  (MAIN)
  IN  BUFGVN
  IN  BUFRVN
  IN  CONSOL
  IN  DATVNA
  IN  DATVNI
  IN  DATVNL
  IN  DATVNS
  IN  DIRFTV
  IN  DTENVN
  IN  DTMSVN
  IN  DTNAVN
  IN  ECSFVN
  IN  ECVZVN
  IN  EESTOV
  IN  EHARVN
  IN  ENHAVN
  IN  ENHBVN
  IN  EQARVN
  IN  EQHAVN
  IN  EQHBVN
  IN  EQHRVN
  IN  ERHAVN
  IN  ERQEVN
  IN  FADBVN
  IN  FEDVIS
  IN  HDYRVN
  IN  HYINVN
  IN  INDAVN
  IN  INMKVN
  IN  INTSVN
  IN  INVTVN
  IN  IPVOCD
  IN  IPVODA
  IN  IVZIVN
  IN  IWNKVN
  IN  IWVZVN
  IN  JNVOVN
  IN  KNBLVN
  IN  KTADVN
  IN  LQARVN
  IN  LQNAVN
  IN  LQNRVN
  IN  MRKCVN
  IN  PIPAVN
  IN  PIPBVN
  IN  PIPCVN
  IN  PIPIVN
  IN  PIPLVN
  IN  QNBFVN
  IN  RDKVVN
  IN  RECOVT
  IN  RRFAVN
  IN  RRNKVN
  IN  RRVZVN
  IN  RUKRVN
  IN  SHARVN
  IN  SMUUVN
  IN  SRFAVN
  IN  SRHAVN
  IN  SRKHVN
  IN  SRKRVN
  IN  SRNKVN
  IN  SRVZVN
  IN  STTSVN
  IN  VNCHVN
  IN  VORCON
  IN  VORRVN
  IN  VORSIN
  IN  VRARVN
  IN  VRNKVN
  IN  VRVZVN
  IN  WNUBVN
  IN  ZRIPVN
    IN  CEHAVN
    IN  CEQEVN
    IN  CNSCVN
    IN  CONCVN
    IN  CQARVN
    IN  CVZVVN
    IN  EXKBVN
    IN  EXVBVN
    IN  INSHLL
    IN  ITRWVN
    IN  ITRTVN
    IN  KNOTVN
    IN  RHRKVN
    IN  RHRNVN
    IN  RHRVVN
    IN  ROHRVN
    IN  SHROVN
    IN  VOREGD
    IN  VRSMVN
SEG  RESTRT* ,  (MAIN)
  IN  RCBLVN
  IN  RECOVB
  IN  RCVCVN
  IN  RCVRVN
  IN  RCVWVN
    IN  RCVYVN
SEG  STATOP* ,  (MAIN)
  IN  STTHVN
  IN  STFRVN
    IN  STT3VN
END
```

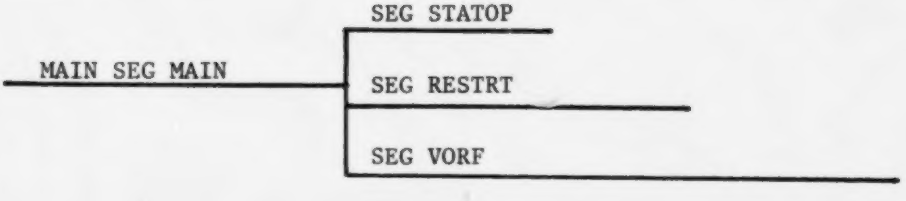

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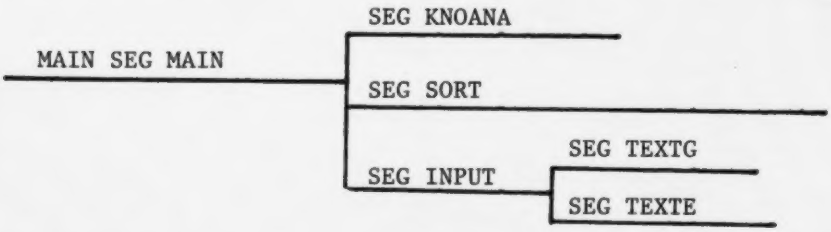
TABLE 10. OVERLAY STRUCTURE OF THE PROGRAM STATCS

```
SEG  MAIN
  IN  STATCS
  IN  ABORT
  IN  BLANK
  IN  CPYCOL
  IN  DIRECT
  IN  ERRORS
  IN  HEADER
  IN  LOOKER
  IN  PAGECT
  IN  QCLEAR
  IN  SKALT1
  IN  UEBER
    IN  BLANK&COMMON
    IN  ANZAHL
    IN  CNTRLS
    IN  DAUERN
    IN  ERROR
    IN  HAFENZ
    IN  INPT
    IN  INTKNO
    IN  IOUNTS
    IN  METRIS
    IN  NAMEN
    IN  REGG
    IN  SKALA
    IN  VRTEIL
SEG  INPUT*(MAIN)
  IN  CVDIGT
  IN  CVFLTG
  IN  CVINTG
  IN  DMPCOM
  IN  INISYS
  IN  INICHS
  IN  INIEDM
  IN  INIFAK
  IN  INIKNO
  IN  INIMON
  IN  ININOT
  IN  INISKA
  IN  INISMU
  IN  INIREG
  IN  INIWAL
  IN  INIZDM
  IN  INGRAF
  IN  INSPRA
  IN  JOINA4
  IN  PRUEF
  IN  PUTGET
  IN  RDCARD
  IN  SKALT2
  IN  SKBLNK
  IN  STHEPS
    IN  CDBUFR
    IN  CHRSET
    IN  SAVRUM
    IN  SYSPRM
SEG  TEXTE*(INPUT)
  IN  INTXT2
SEG  TEXTG*(INPUT)
  IN  INTEXT
SEG  SORT*(MAIN)
  IN  INITIA
  IN  PRTSUM
  IN  RDKNOT
  IN  SORT1
  IN  SORT2
  IN  SORT3
  IN  SORT4
  IN  STD1RT
    IN  SORTFD
    IN  SFAKTR
SEG  KNOANA*(MAIN)
  IN  CHECK
  IN  DRUCK1
  IN  DRUCK2
  IN  EINZEL
  IN  GRAPH1
  IN  INIDIM
  IN  INREGG
  IN  KNOANA
  IN  LOKREG
  IN  PAGDEF
  IN  RDBECK
  IN  RDBEMN
  IN  RDREGN
  IN  RDVORF
  IN  STODIM
  IN  STOREG
  IN  TSTNOT
  IN  VERGL
    IN  ARRY
    IN  HAFS
    IN  JNPT
    IN  REGO
    IN  TEXT
END
```



SECTION 3

PROGRAM HANDLING

GENERAL

The following handling descriptions are intended to enable users to apply the QQS program package on their own. However, successful application of complex mathematical models for urban runoff control generally requires some background in mathematical modeling and computer applications and thorough experience in urban drainage planning.

The control cards given should not be changed because in some cases they instruct sets of internal control cards. The version described is valid for all UNIVAC machines of the 1100 series with EXEC 8 control systems. The programs and their individual sets of internal control cards are contained in a file designated "qqs" in the following description. The user can establish this "qqs" file under an arbitrary name. Note: On all control cards given the symbolic file name "qqs" must be replaced by the entire real file name including its qualifier (e.g., I0073-9858PR*QQS).

Data files are always established using the same name, whereby the use of different qualifiers enables the working of several file versions simultaneously. The qualifier-card must directly succeed the RUN-card. If the qualifier-card is not used, the data files obtain as qualifier the project-ID from the RUN-card.

The QQS program package enables:

- the runoff simulation of single rainfall events for individual drainage areas, whereby the maximum duration of an event is 99 intervals of 5-minute duration each;
- the runoff simulation of single rainfall events for entire sewer and receiving water systems, whereby the maximum duration of an event is 288 intervals of 5-minute duration each;
- continuous runoff simulation at 5-minute intervals for continuous precipitation records for periods up to 20 years, including subsequent statistical analysis of the continuous simulation results; and
- precipitation statistics.

Both single event and continuous simulations can be made for sewer systems and for receiving water systems. In general, any pollutant may be con-

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sidered except for pollution parameter 3 (P3), which is reserved for fecal coliforms (FC) because special units are used for their measurement.

CPU time estimates provided later are for UNIVAC 1108 and are based on experience with the Augsburg, Rochester and Vancouver projects. For a UNIVAC 1106, the times given must be doubled and for a UNIVAC 1110 the times given can be divided by 2. It must be understood that, particularly because of the simulation programs MNTWKC/MRBNTC, the CPU time is dependent on the size and geometrical lay-out of the sewer and receiving water systems.

RUNOFF SIMULATION FOR INDIVIDUAL DRAINAGE AREAS

Program QQSEGL

Description of QQSEGL--

The program QQSEGL computes the runoff from an individual drainage area and its pollution load. The computation method employed is in accordance with the runoff simulation method for drainage areas of the program MNTWKC. The major application of the program QQSEGL is for verification purposes of the unit hydrographs and unit pollutographs (unit pollutant load hydrographs) whereby calculated and measured runoff data are compared.

The maximum duration of precipitation that can be accepted by QQSEGL is 495 minutes, which equals 99 time intervals of 5-minute duration. The maximum number of pollutants which may be considered is two.

Control and Data Card Requirements for QQSEGL--

```
a)   "RUN  (approximately 1 CPU second)
b)   "ASG,A  qqs.
c)   "XQT  qqs.QQSEGL
-     Data cards
d)   "FIN
```

The input data requirements are listed in Appendix 1, Data Cards for QQSEGL. An example is given in Appendix 6, Test Example for QQSEGL.

Error Messages of QQSEGL--

There are no program related error messages.

Output of QQSEGL--

The major output of the program QQSEGL are hydrographs and pollutographs (pollutant load hydrographs), calculated and measured (as given by input), as well as the differences between calculated and measured values. Output examples are provided in Section 1 of this volume, Figures 3 and 4.

Programs Required for Runoff Simulations in Sewer Systems

For runoff simulations in sewer systems the following sequence of programs must be used:

DTCHCK
DWTFLC
TXTFCE and TXTFCG
RCVRIN and MNTWKC
MNTWSP (for single event simulations)
STATCS (for continuous simulations)

In case data files do not exist or were deleted, the files must be provided with the following control cards prior to running DTCHCK:

```
a)   "RUN  (approx. 2 CPU second)
b)   "QUAL  arbitrary qualifier
c)   "ASG,A  qqs.
d)   "ADD  qqs.CATALOG/IFXXDFSE (for single event simulations only)
e)   "ADD  qqs.CATALOG/IFXXDFMNTWMY  ┐
f)   "DATA,IN  *IF27.               │
g)   "ADD,D  qqs.TEXT/INTXT2        │
h)   "END                           ├(for continuous simulations only)
i)   "DATA,IN  *IF28.               │
j)   "ADD,D  qqs.TEXT/INTEXT        ┘
k)   "END
l)   "FIN
```

For single event calculations the programs above may be operated individually or as one run, except for STATCS which must be executed individually. Operating the programs as one run, the sequence is interrupted if an error is found by any one of the programs.

Program DTCHCK

Description of DTCHCK--

The program DTCHCK checks the precipitation, network, quantity and quality data for format and plausibility. Once the input data are found to be without error, internal input files for the simulation part of the package are created.

DTCHCK input may be provided in metric or English units. The pollution parameter Fecal coliform must be entered as the third pollutant. In case of frequent checks or changes of only one of the input files, the network file, for instance, it is advisable to store the unchanged files permanently. For final calculations, program results should be secured for multiple outputs. The running time of the program DTCHCK is about 60 CPU seconds. The core requirement of DTCHCK is 55 K UNIVAC words.

Control and Data Card Requirements for DTCHCK--

```
a)   "RUN
b)   "QUAL  arbitrary qualifier
c)   "ASG,A  qqs.
d)   "ADD  qqs.ASGXUSE/IFXX
e)   "ADD  qqs.ASGX/DF
f)   "DATA,IL  *NET.
-    Network Data
g)   "END
h)   "DATA,IL  *QUANT.
-    Quantity Data
i)   "END
j)   "DATA,IL *QUALT.
-    Quality Data
k)   "END
l)   "DATA,IL  *RAIN.            }
-    Precipitation Data          }    (for continuous simulations only)
m)   "END
n)   "ADD  qqs.USE/DF
o)   "XQT  qqs.DTCHCK
p)   "ADD  *NET.
q)   "FIN
```

In case of errors, the run must be repeated but only the erroneous data files must be replaced, e.g., if the file NET was errorless, the cards f) to g) are omitted. If all input data were correct, the internal files IF01 to IF03, IF05 and IF07 to IF11 are established.

Because input requirements for precipitation, network, quantity and quality data are quite extensive, the data card specifications are listed separately in Appendix 2, Data Cards for DTCHCK.

Error Messages of DTCHCK--

The Program DTCHCK yields an extensive number of program related error messages (F). In addition, informative messages are provided to encourage the user to check any data questioned as to validity. Only the errors (F) must be corrected in order to perform simulations. Due to the program structure, all of these error and informative messages are in German, the corresponding English translations are listed separately in Appendix 3, Error Messages and Output Headings of DTCHCK.

Output of DTCHCK--

The program DTCHCK provides listings and summaries of all input data. Internal input files enter the runoff simulation programs RCVRIN and MNTWKC. These internal input files are written in metric units even when English units are used originally, because the runoff calculations always use metric units. An output example is contained in Appendix 7, Test Example for DTCHCK.

Program DWTFLC

Description of DWTFLC--

The program DWTFLC simulates the runoff of one full day under dry-weather flow conditions and establishes the internal files IF13 and IF21. Note: Dry-weather flow usually has little influence on the storm runoff behavior. Therefore the diurnal variation of dry-weather flow normally may be neglected.

Under dry-weather flow conditions, no overflows at the boundaries of the calculation area are allowed. For basins, the water depths must be less than their heights, i.e., the basins cannot be surcharged under dry-weather flow conditions. If this condition is violated, warnings are printed out. Note: A value of 120 iterations must not be exceeded. If this value is reached or exceeded, the calculations are not convergent and the input has to be rechecked, in which case the dry-weather flow results of the last five iterations are output. Possible sources for nonconvergence are:

a) Unallowed backwater (unallowed under dry-weather flow conditions only) indicated by large values for HA and HE;
b) branching points, if the values for H and Q differ between the iterations;
c) overflows at the network boundary are occurring or basins are pressurized;
d) overflows and basins, if similar conditions to b); or one iteration overflowing, next iteration no overflow, etc.;
e) pumps, if maximum capacity too low to pump dry-weather flow;
f) gates, if closed or closing under dry-weather flow conditions.

The major corrective measures to be taken are: to increase weir heights and eliminate backwater by changing pipe element dimensions or roughness coefficients.

In the case of a variable dry-weather flow the triggering water level for gate closure must not be reached. This possibility is checked by the program and warnings are printed out. Also, whenever input data are changed, the dry-weather flow calculation must be repeated prior to the actual runoff simulation with RCVRIN and MNTWKC. The running time is approximately 40 CPU seconds and the core requirements of DWTFLC is 50 K UNIVAC words.

Control and Data Card Requirements for DWTFLC--

```
a)   "RUN
b)   "QUAL  arbitrary qualifier
c)   "ASG,A  qqs.
d)   "ADD  qqs. ASGXUSE/IFXX
e)   "XQT  qqs.DWTFLC
f)   "FIN
```

No data cards are required for the program DWTFLC.

Error Messages of DWTFLC--

An error message is given if the maximum number of iterations (121) is reached. In this case the network has to be rechecked as described above.

Warnings are given if gates are closing, overflows are occurring or basins are pressurized under dry-weather flow conditions.

Output of DWTFLC--

For a successful run, the maximum and average number of iterations and maximum water depth for basins under dry-weather flow conditions are printed out. When calculation nonconvergencies occur, the dry-weather flow results for the last five iterations are output. An example is provided in Appendix 8, Test Example for DWTFLC.

Programs TXTFCE and TXTFCG

Description of TXTFCE and TXTFCG--

The program TXTFCE provides the output headings. One output file named IF25 is necessary. The program TXTFCE has to be executed only once for each qualifier used. The running times are minor (UNIVAC 1108: 0.2 CPU seconds).

The program TXTFCG provides for output in metric units. One output file named IF26 is necessary. Program TXTFCG also has to be executed only once for each qualifier used. The running times also are minor.

Control and Data Card Requirements for TXTFCE and TXTFCG--

```
a)    "RUN
b)    "QUAL  arbitrary qualifier
c)    "ASG,A  qqs.
d)    "ASG,A  *IF25.
e)    "XQT  qqs.TXTFCE
f)    "ADD  qqs.TEXT/TXTFCE
-     1 data card containing in columns 1 - 52 (center positioned)
      an arbitrary heading, e.g., CITY OF ROCHESTER
g)    "FIN
```

For program TXTFCG control cards e) and f) are replaced by:

```
e)    "XQT  qqs.TXTFCG
f)    "ADD  qqs.TEXT/TXTFCG
```

Error Messages of TXTFCE and TXTFCG--

TXTFCE and TXTFCG yield no program related error messages.

Output of TXTFCE and TXTFCG--

The programs have no output.

Programs RCVRIN and MNTWKC

Description of RCVRIN and MNTWKC--

The program RCVRIN initializes all recovery files needed by the program MNTWKC. The latter program performs the actual simulations of quantity and quality of runoff from the drainage areas and its transport through the sewer system.

RESTART may be used in case of a system breakdown or a maximum time interruption. If the space provided for output is not sufficient, a message is given and the calculation will be interrupted, but this situation is unlikely to occur. Continuous simulation results are written on the files IF04, IF18, IF19 and IF22. In case of a RESTART, further results continue to be written on these files. In case of an interrupt and RESTART, the runoff of the last rainfall event calculated is lost. The runoff of more rainfall events may be lost if their runoffs are less apart than the duration of the maximum flowtime.

It is suggested that continuous simulations be calculated year by year, and that the results be saved on the files IF14 to IF24, each time prior to a RESTART. After completion of a continuous simulation, the files IF01 to IF26 must be copied and secured on tape including their qualifiers.

For single event simulations all initialization values must correspond to 00.00 (hr.min) of the day of rainfall. Using all program capabilities for single event simulations, running times in the magnitude of 10 to 20 CPU minutes may be expected. However, the exact running time depends on the sewer system layout.

For continuous simulations the total computing time may be estimated on the experience gathered with single event simulations of a specific system by: Total computing time = time per interval * (number of precipitation intervals + number of events * max. flow time of the system in intervals).

The core requirement of MNTWKC is 120 K UNIVAC words.

Control and Data Card Requirements for RCVRIN and MNTWKC--

a) "RUN
b) "QUAL arbitrary qualifier
c) "ASG,A qqs.
d) "ADD qqs.ASGXUSE/IFXX
e) "XQT qqs.RCVRIN
f) "XQT qqs.MNTWKC
- One data card for single event simulations:
  Column 3 : 1
  Columns 4 - 6: Estimate of the maximum flow time in the network in 5-minute intervals (Format I3), for example Augsburg 56, Vancouver 40.

Columns 10 - 11:	Maximum number of iterations (Format I2, default value 15). Increasing this limit under normal conditions will not yield better results but will only increase the calculation time.

- Data cards for continuous simulations:

Data card 1 (FORTRAN format 3I3, 1I2)

Column 3 :	1
Columns 4 - 6:	Maximum flow time in intervals (same as for single event simulations).
Columns 7 - 9:	Total number of nodes of interest and special nodes of interest for which subsequent statistical analysis will be done.
Columns 10 - 11:	Maximum number of iterations (default value 15). Increasing this limit under normal conditions will not yield better results but will only increase the calculation time.

Data card 2 and those following (FORTRAN format 8F10.0) contain the critical basin depths in meters, at which the end of the storm runoff is considered. The sequence of the basins must be identical with the sequence on the output from program DWTFLC. For an estimate of dry-weather flow depths see output of program DWTFLC.

g) "FIN

Note: The card e) has to be read only once for a continuous simulation. In case of a RESTART and calculation of additional years, this card must be removed.

Error Messages for RCVRIN and MNTWKC--

An error message is given if the pollutant initialization is not completed. Large basins in particular, have to be checked, if pollutants can travel through these basins within the maximum flow time provided.

Output of RCVRIN and MNTWKC--

There is no output for the program RCVRIN. The output of MNTWKC mainly indicates how many iterations are used in each time step and if control gates are operating. Furthermore, the total pollutant wash-off from catchment areas is provided for the time of calculation, specified by area types (see Section 1 of this volume, Figure 8). These outputs from MNTWKC may be considered as internal and are not discussed further here. However, an example is provided in Appendix 9, Test Example for RCVRIN and MNTWKC.

For single event simulations the hydrographs and pollutographs are stored on file IF23, which may be printed by the program MNTWSP. For continuous simulations, the results are stored in files for further evaluation by the statistics program STATCS.

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Program MNTWSP

Description of MNTWSP--

The program MNTWSP prints single event simulation results, which were written by the program MNTWKC on file IF23. For final calculations, the results should be secured for multiple outputs. The running time of the program MNTWSP, of course, depends on the number of printout segments and intervals, but is usually around 1 CPU minute on a UNIVAC 1108.

Control and Data Card Requirements for MNTWSP--

```
a)   "RUN
b)   "QUAL  arbitrary qualifier
c)   "ASG,A  qqs.
d)   "ADD  qqs.ASGXUSE/IFXX
e)   "XQT  qqs.MNTWSP
-    One data card
     Column   1 -  3:     The number of time intervals to be printed out
                          is specified (FORTRAN format I3). The value
                          given may be smaller but not larger than the
                          number of time steps simulated in MNTWKC.
f)   "FIN
```

Error Messages of MNTWSP--

There are no program related error messages in MNTWSP.

Output of MNTWSP--

For the segments and nodes specified by input to program DTCHCK flow and depths hydrographs and pollutographs are provided. The output is described in detail in Section 1 of this volume (Figures 5, 6 and 7). Further examples are contained in Appendix 10, Text Example for MNTWSP.

Single Event Simulations as One Run

The control and data card requirements for single event simulations in one run are:

```
                                   a)   "RUN
                                   b)   "QUAL  qualifier
                                   c)   "ASG,A  qqs.
Provision of files                 d)   "ADD  qqs.CATALOG/IFXXDFSE
Assignment of files                e)   "ADD  qqs.ASGXUSE/IFXX
Provision of text file             f)   "XQT  qqs.TXTFCE
                                   -    Data card
Provision for metric units         g)   "XQT   qqs.TXTFCG
                                   -    Data card
                                   h)   "DATA,IL  *RAIN
                                   -    Precipitation data
                                   i)   "END
                                   j)   "DATA,IL  *NET.
                                   -    Network data
                                   k)   "END
```

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```
                                     l)    "DATA,IL  *QUANT.
                                     -     Quantity data
                                     m)    "END
                                     n)    "DATA,IL  *QUALT.
                                     -     Quality data
                                     o)    "END
                                     p)    "ADD  qqs.USE/DF
Data check                           q)    "XQT  qqs.DTCHCK
                                     r)    "ADD  *NET.
                                     s)    "ERS  *IF13.
DWF Calculation                      t)    "XQT  qqs.DWTFLC
Recovery file initialization         u)    "XQT  qqs.RCVRIN
Actual simulation                    v)    "XQT  qqs.MNTWKC
                                     -     Data card
Printout                             w)    "XQT  qqs.MNTWSP
                                     -     Data card
                                     x)    "FIN
```

For explanations see the previous descriptions. For an estimate of the total running time the estimates for the individual programs given may be added.

Program STATCS

Description of STATCS--

The basic continuous simulation results are quantities and pollution loads entering or leaving the special nodes of interest and overflowing or surcharging at the nodes of interest. The special nodes of interest and the nodes of interest were specified by input to the program DTCHCK. The data at these specified nodes are organized and one- or two-dimensional statistical analyses are made for different statistical properties. A list of the properties which may be considered is contained in Appendix 5, Properties for Statistical Analysis. Monthly and annual total overflow figures are also evaluated. To evaluate average and maximum values and totals per event prior to statistical analysis the data for entering and leaving amounts are considered from the start to the end of a runoff. The per event data for overflow and surcharge conditions are considered accordingly.

The pollutant values normally are dimensioned as kg (lb), kg/s (lb/s) and mg/l (ppm), respectively. For statistical analysis of fecal coliforms, however, the user must substitute in the output the dimensions 10^{10} counts, 10^{10} counts/s and 10^{10} counts/l, respectively.

Note that some of the statistical properties are on an event basis, while others represent interval values. In the latter case the values are arranged only by their magnitude, and thus the relation to the individual overflow event is lost. In this case it is possible to derive duration curves from the cumulative frequency curve.

A direct combination or comparison between two one-dimensional frequency distributions or cumulative frequency curves is not possible. A cross correlation between two statistical properties can be obtained only by two-dimensional statistical analysis.

Because the statistics scales are not chosen automatically by this program, the maximum values have to be estimated for the properties investigated. A good estimate is obtained on the basis of the runoff and overflow results of a synthetic storm with a one-year recurrence, adding for maximum scale values approximately 20 to 50 percent. The final scale should be adjusted in a way that the data are grouped approximately in a normal distribution.

To find the optimum scales quickly, as a first trial it is suggested that all properties at all nodes be analyzed with one (large) common estimate for the maximum scale value of each property. Then in further runs for individual nodes or small groups of nodes, the scales can be finalized. For the final results the maximum scale value should not be exceeded by data for a less-than-two-year frequency. Usually the best distributions can be obtained by using individually adjusted scales. For basins or pumps, one common statistics run is sufficient, because continuous simulation results for these facilities are obtained only under surcharge conditions.

It is advisable to use the graphical output option only for final runs and annual statistics.

For control of statistical of results, the following checks are suggested:

a) The total number of events, which is the sum of the individual frequencies; on an event basis, they must be equal for all properties.

b) Total numbers of events or total numbers of intervals or annual totals; if, after a change in scales, different total numbers are obtained, the data are overwritten, i.e., if the internal files 9 or 11 were too small.

c) General plausibility of comparison of total surface runoff and total volume of discharge and overflows.

Development of overflow abatement alternatives and the referencing of single event simulation results to statistical results can be done in conjunction with statistical analyses (2).

The running time on a UNIVAC 1108 for monthly and annual statistics is approximately 5 CPU seconds per statistical property per node.

Control and Data Card Requirements for STATCS--

```
a)   "RUN
b)   "QUAL  qualifier same as for IF18 and IF19
c)   "ASG,A  qqs.
d)   "ADD  qqs.ASGX/STTF
```

e) "XQT qqs.STATCS
- Data cards
f) "FIN

Because data card requirements are extensive, they have been listed in Appendix 4, Data Cards for STATCS. A test example for STATCS is given in Appendix 11.

Error Messages of STATCS--

Program related error messages are given if input data or files are not prepared according to specifications.

Output of STATCS--

The major output of the statistics program STATCS consists of:

- Monthly and annual totals of entering and leaving, discharging and overflowing volumes and pollutant loads.
- Frequencies and cumulative frequencies for one-dimensional statistics as tabulated and graphical outputs.
- Frequencies and cumulative frequencies of two-dimensional statistics as tabulated and graphical outputs.

For a discussion of output interpretation see Section 1 of this volume (Figures 9 to 13).

RUNOFF SIMULATION FOR RECEIVING WATER SYSTEMS

Programs Required for Runoff Simulations in Receiving Water Systems

Simulation of a receiving water system can be started only subsequent to the simulation of the corresponding sewer system. For runoff simulations in receiving water systems the following sequence of programs must be used:

DTCHCK
RCVRIN and MRBNTC
MRBNSP (for single event simulations)
STATCS (for continuous simulations)

In case data files do not exist or were deleted, the files must be provided by the following control cards prior to running DTCHCK:

a) "RUN (approximately 2 CPU seconds)
b) "QUAL arbitrary qualifier
c) "ASG,A qqs.
d) "ADD qqs.CATALOG/MRBDF
(for single event and continuous simulations)

Also before starting DTCHCK for the receiving water system, all IF-Files from the sewer system calculation must be saved on tape, as they will be overwritten by the results from a receiving water system calculation.

The files IF07, IF15, and IF16 of the sewer system calculation are used in the receiving water calculation. If a receiving water system run fails, these three files must be loaded again from the tape.

Program DTCHCK for Receiving Water Simulations

Description of DTCHCK for Receiving Water Simulations--

Program DTCHCK checks the receiving water network data (file MRBNET), quantity data for the receiving water system (file MRBQNT), and quality data for the receiving water system (file MRBQLT) for format and plausbility. When the data contain no errors internal input files for the actual simulation part of the package are created.

When erroneous data occur, the file IF07 from the sewer system calculation must be provided again prior to the start of a new DTCHCK run. The running times of the program DTCHCK for receiving water systems are in the magnitude of 40 CPU seconds.

Control and Data Card Requirements for DTCHCK for Receiving Water Simulations--

```
a)   "RUN
b)   "QUAL  arbitrary qualifier
c)   "ASG,A  qqs.
d)   "ADD  qqs.ASGXUSE/IFXX
e)   "ADD  qqs.ASGX/MRBDF
f)   "DATA,IL  *MRBNET.
-    Network data
g)   "END
h)   "DATA,IL  *MRBQNT.
-    Quantity data
i)   "END
j)   "DATA,IL  *MRBQLT.
-    Quality data
k)   "END
l)   "ADD  qqs.USE/MRBDF
m)   "XQT  qqs.DTCHCK
n)   "ADD  *MRBNET.
o)   "FIN
```

In case of errors, the data check run must be repeated but only the erroneous data files must be replaced, e.g., if the file MRBQLT is errorless, the control cards j) - k) are omitted. If all input data are correct, the internal files IF06, IF07 and IF12 are established. Because the input requirements for the network, quantity and quality data are quite extensive, the data card specifications are contained separately in Appendix 2, Data Cards for DTCHCK.

Error Messages of DTCHCK for Receiving Water Simulations--

There is an extensive number of program-related error messages (F) that refer to erroneous input data. In addition, informative messages are provided to encourage the user to check the flagged data for their validity. Only the errors (F) must be corrected in order to perform simulations. Because of the program structure, all of these error-and-information messages are in German and Appendix 3 lists the corresponding English equivalents.

Output of DTCHCK for Receiving Water Simulations--

Listings and summaries of all input data are provided by the program DTCHCK. Again internal input files enter the runoff simulation programs RCVRIN and MRBNTC. All values in the internal files are in metric units even if English units were used originally, because the runoff calculations are always performed in metric units.

Programs RCVRIN and MRBNTC for Receiving Water Simulations

Description of RCVRIN and MRBNTC for Receiving Water Simulations--

The program RCVRIN initiates all recovery files required by the program MRBNTC. The program MRBNTC performs the simulations of quantities and qualities of runoff throughout the receiving water system.

In performing continuous simulations, RESTART may be used in case of a system breakdown or a maximum time interruption. If the space provided for output is not sufficient, a message is given and the calculation will be interrupted, but this situation is unlikely to occur. In case of an interrupt and RESTART, certain results are lost, to wit; the runoff results of the last discharge or overflow event routed through the receiving water system; also the runoff results for more than one event if the runoff of the last event is connected by maximum flowtime with the runoff of the preceeding event.

It is suggested that continuous simulations be performed year by year and that the results be saved on the files IF01 to IF26 (except IF04 and IF22) each time prior to a RESTART. After completion of a continuous simulation, the files IF01 to IF26 (except for IF04 and IF22) should be copied and secured on tapes. The qualifiers, accordingly, should be used without fail.

Using all program capabilities for single event simulations, running times of 5 to 8 CPU minutes may be expected. It should be understood that the running time is dependent on the system layout.

For continuous simulations, the total computing time may be estimated on the basis of experience gained with single event simulations of a specific system by: Total computing time = time per interval * (number of all outfall or overflow intervals + number of events * maximum flow time of the system in intervals). The core requirement of MRBNTC is 52 K UNIVAC words.

Control and Data Cards for RCVRIN and MRBNTC for Receiving Water Simulations--

a) "RUN
b) "QUAL arbitrary qualifier
c) "ASG,A qqs.
d) "ADD qqs.ASGXUSE/IFXX
e) "XQT qqs.RCVRIN
f) "XQT qqs.MRBNTC
- One data card (FORTRAN format 3I3, 1I2)

Column 3 :	1
Columns 4 - 6:	Maximum flow time in intervals (same as for single event simulation).
Columns 7 - 9:	Total number of nodes for which subsequent statistical analysis is to be done. For single event runs columns 7 - 9 must be blank.
Columns 10 - 11:	Maximum number of iterations (default value 15). Increasing this limit usually will not yield better results but only increases the calculation time.

g) "FIN

Note: The card e) has to be read in only once for a continuous simulation. In case of a RESTART and the calculation of additional years, this card must be removed.

Error Messages for RCVRIN and MRBNTC for Receiving Water Simulations--

An error message is given when the pollutant initialization is not completed prior to routing of each discharge and overflow event through the receiving water system.

Output of RCVRIN and MRBNTC for Receiving Water Simulations--

There is no output for the program RCVRIN. The output of MRBNTC mainly indicates how many iterations were used in each time step. This output may be considered as internal and is not discussed further.

For single event simulations, the hydrographs and pollutographs are printed by the program MRBNSP. For continuous simulations, the results are stored on files for further evaluation by the statistics program STATCS.

Program MRBNSP for Receiving Water Simulations

Description of MRBNSP for Receiving Water Simulations--

The program MRBNSP prints single event simulation results produced by the program MRBNTC. For final calculations the results should be secured for multiple outputs. The running time of the program MRBNSP, which depends on the number of printout segments and intervals, usually is less than 1 CPU minute on UNIVAC 1108.

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Control and Data Card Requirements for MRBNSP for Receiving Water Simulations--

a) "RUN
b) "QUAL arbitrary qualifier
c) "ASG,A qqs.
d) "ADD qqs.ASGXUSE/IFXX
e) "XQT qqs.MRBNSP
- One data card
  Column 1 - 3: The number of time intervals to be printed out (FORTRAN format I3). The value given may not be larger than the number of time steps simulated in MRBNTC.
f) "FIN

Error Messages of MRBNSP for Receiving Water Simulations--

There are no program related error messages in MRBNSP.

Output of MRBNSP for Receiving Water Simulations--

Flow and depth hydrographs and pollutographs are provided for the segments and nodes specified by input to the program DTCHCK.

Program STATCS for Receiving Water Simulations

The basic continuous simulation results are hydrographs and pollutographs at the nodes of interest specified by input to the program DTCHCK in connection with receiving water system simulations. For receiving water statistics these data are also sorted and analyzed by the program STATCS. One- and two-dimensional analyses may be performed for the statistical properties specified by input to the program STATCS. Appendix 5 contains a list of properties for statistical analysis.

It should be noted that for evaluation of average values and totals the time basis taken for an event is the duration of runoff (duration of sewer system overflows and the maximum flow time in the receiving water system as defined in the input to the program RCVRIN and MRBNTC). For further remarks, control and data card requirements, error messages and output see the previous description of program STATCS (pages 46-48).

PRECIPITATION STATISTICS

Program RAINSC

Description of RAINSC--

This program statistically analyses precipitation records covering a maximum of 20 years. Analysis can be made of 11 different properties on an annual and monthly basis. Analysis of complete records is possible as well as selective analysis of individual years or months as specified by input. For each property the analysis is presented for two scales: A linear scale based on the maximum value detected; and a scale chosen to contain automati-

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cally at least 50 percent of all values occurring. RAINSC allows for metric units only.

The precipitation data of each record must be on a separate file in the format specified in Appendix 2, Data Cards for DTCHCK, Precipitation Data, Omitting cards 3 and 7 will allow for one precipitation series only.

The annual statistics are based only on the months specified on data card 4 of program RAINSC. The maximum dry spell specified on data card 2 (RAINSC) ensures that for statistics this dry spell is the maximum value. This value is not an artificial dry spell resulting from an interrupted record (as for instance September to May, if precipitation data for May to September were provided).

After each calculation the file PRINT, which contains the rainfall statistics, must be saved. The running time of the program RAINSC is approximately 2.5 CPU minutes for a record of 20 years, with each year containing 5 months of data.

The statistical properties analyzed by program RAINSC are given in Appendix 5, Properties for Statistical Analysis.

Control and Data Card Requirements for RAINSC--

Prior to running the program RAINSC the text file *TFRS must be created by:

```
"ASG,AX  qqs.
"DELETE,C  *TFRS.
"ASG,UP  *TFRS.,F14///10
"XQT  qqs.TEXTFC
"ADD  qqs.TEXT/RAINSC
"FIN
```

The control and data cards for the program RAINSC are:

```
a)   "RUN
b)   "QUAL  qualifier, under which the precipitation data are on file
c)   "ASG,AX  qqs.
d)   "ASG,AX  qualifier of program *TFRS.
e)   ASG,AX  *file name of precipitation data
f)   "USE  11,  *file name of precipitation data
g)   "DELETE,C  *FIRS.
h)   "ASG,T  *FIRS., F14///500
i)   "DELETE,C  *FRRS.
j)   "ASG,T  *FRRS., F14///500
k)   "XQT  qqs.RAINSC
-    Data cards
     Data card 1     :   Language card
     Columns   1 - 4:   *LAN
     Column    8     :   E for English or G for German
```

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Data card 2 :	Maximum dry spell
Columns 1 - 4:	*MDS
Columns 6 - 72:	Approximation of real maximum dry spell in 5-minute intervals (integer number). Longer dry spells, theoretically provided by input for interrupted records, must not be considered.
Data card 3 :	Choice of years
Columns 1 - 4:	*YAR
Columns 7 - 65:	Years (FORTRAN format I3, e.g., 67 68 69), on which statistical analysis should be based (20 at a maximum). If all years provided on the precipitation data file should be considered, this card is omitted.
Data card 4 :	Choice of months
Columns 1 - 4:	*MNT
Columns 7 - 42:	Months per year (FORTRAN format I3, e.g. 7 8 9 10) on which statistical analysis should be based. If all months provided on file should be considered, this card is omitted.
Data card 5 :	End card
Columns 1 - 2:	**
	For additional statistical analysis of the precipitation record in question, data cards 1 through 5 follow again.
Data card 6 :	End of data cards
Columns 1 - 3:	***

1) "FIN

Error Messages of RAINSC--

Program related error messages are given, if direct input data or data contained in the precipitation files supplied are erroneous.

Output of RAINSC--

Frequencies, cumulative frequencies, and cumulative frequencies in percent are provided of the properties analyzed for linear scales based on the maximum value occurring; the same is given for a detailed linear scale, which is chosen so that at least 50 percent of all values are contained in the nine lower scale ranges of the detailed scale. Section 1 of this volume contains a discussion of the output (see also Figure 14). A test example for RAINSC is contained in Appendix 12.

SECTION 4

TEST EXAMPLES

GENERAL

In order to illustrate the program handling characteristics of the QQS program package a test example is provided. Even though the example as a whole is hypothetical, the input data to the individual programs mainly were taken from actual projects in order to provide realistic figures, especially for the functions which are specific for the QQS method.

Input and output are illustrated for the program QQSEGL, which simulates the runoff from individual drainage areas, for the program sequence DTCHCK, DWTFLC, TXTFCE, (TXTFCG,) RCVRIN, MNTWKC, MNTWSP and STATCS, which are used to perform runoff simulations in sewer systems, as well as for the program RAINSC, the precipitation statistics program. A comprehensive test example is used to demonstrate the association of the individual programs. It must be understood that only a few facets of the many application possibilities offered by the programs can be demonstrated by this example.

All input is prepared according to the requirements of Section 2, Program Handling. The output interpretation of the individual programs is explained in Section 1, Program System.

This test example, together with the multitude of verification runs provided in Volume I (Model Description, Testing, and Applications, Section 4, Verification and Testing), are intended to enable a new user to develop a familiarity with input data preparation for the QQS program package.

PROBLEM DESCRIPTION

The demonstration area chosen is drained by both separate and combined sewers. The urbanized catchments are located on both sides of a river (Figure 15). The combined sewer system overflows and the treatment plant effluent enter this receiving water.

The receiving water system may be heavily overloaded because of the many industrial inflows, sewer system outfall discharges and overflows, and nonpoint sources. Therefore, an appropriate scope for a study would be to assess the effect of the present system on the receiving water and to develop structural and nonstructural pollution abatement alternatives on the basis of BOD_5, TSS, fecal coliform, and COD information. Abatement alternatives should utilize the existing sewer system to a maximum. Alternatives

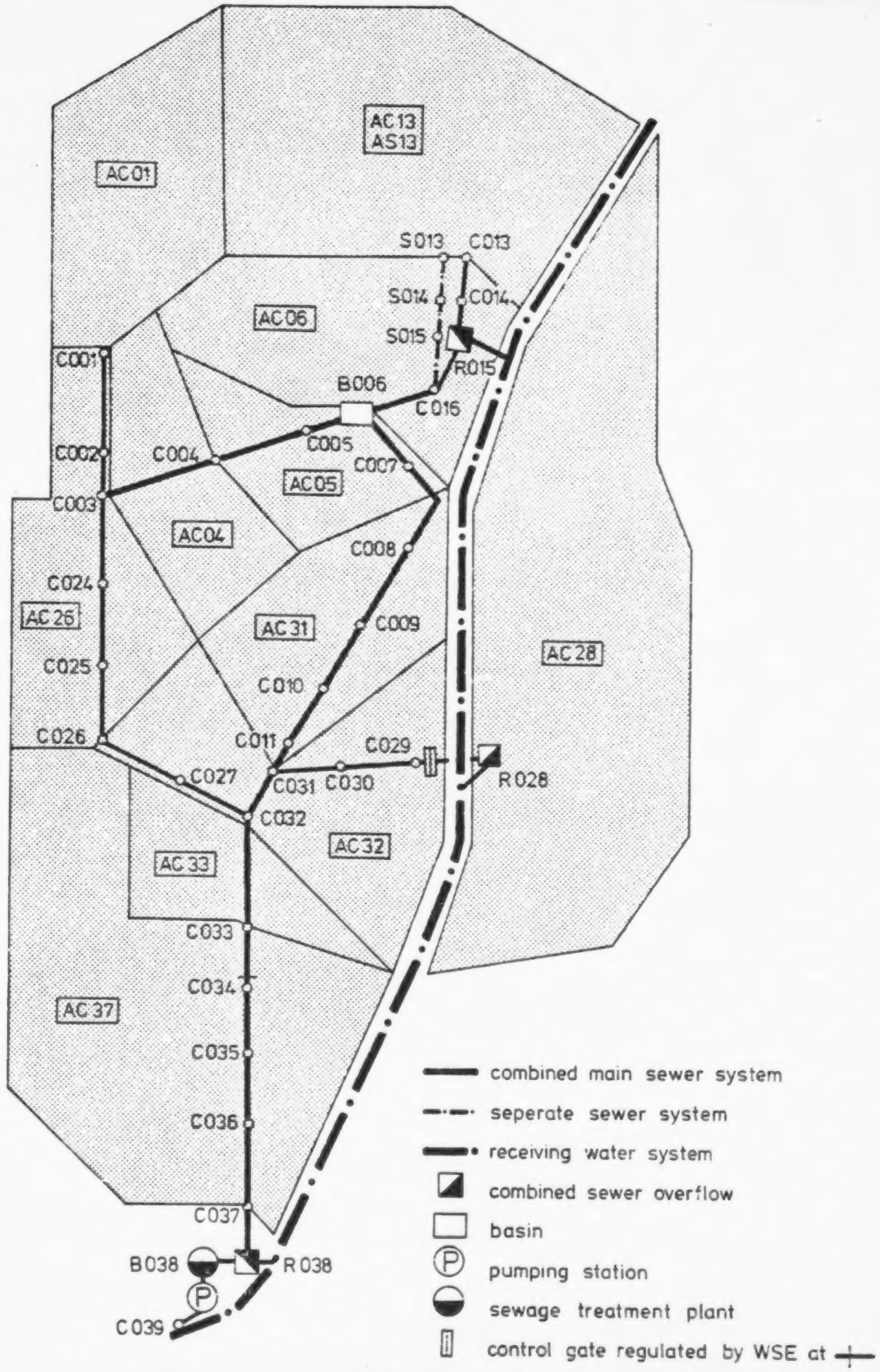
AC13
AS13
AC01
S013
C013
S014
C014
AC06
S015
R015
C001
B006
C016
C002
C004
C005
C007
AC05
C003
AC04
C008
C024
AC26
AC31
C009
AC28
C025
C010
C026
C011
C029
R028
C027
C031
C030
C032
AC32
AC33
C033
C034
AC37
C035
C036
C037
B038
R038
C039
P
combined main sewer system
seperate sewer system
receiving water system
combined sewer overflow
basin
pumping station
sewage treatment plant
control gate regulated by WSE at

Figure 15. Test catchment.

studied may include different levels of surface ponding, inline storage, or operational control as opposed to increasing the treatment plant capacity.

Once the decision has been made to employ a mathematical model for assessment of the pollution problem and the development of abatement alternatives, the study may be subdivided for mathematical model applications into the following phases:

- Data preparation and calibration for present conditions
- Verification of the program package
- Problem assessment
- Data preparation for future conditions
- Development of abatement alternatives for present conditions and/or different stages of future conditions
- Proof that the selected alternatives meet guidelines and receiving water standards.

Even though in the following demonstration the individual programs are applied only once, it should be understood that for an actual project a repetitive application of some programs must be made.

DATA PREPARATION

The catchment under investigation has a total area of 393 ha (971 acres). For simulation purposes this area is subdivided into drainage areas averaging 35 ha (86 acres) in size. The areas are shown in Figure 15. The boundaries of individual drainage areas are defined for ten combined sewer drainage areas and one area drained by a separate sewer system. The outflows of the individual drainage areas are connected to a system of main and trunk sewers (for runoff calculations the individual drainage areas are handled by the QQS model as lumped system). For preparing the network data note, especially in view of continuous simulations, that the computer time is mainly dependent on the number of elements and precipitation intervals considered. Comparisons with field data showed that sewer lengths of approximately 500 m in connection with the 5-minute time step for calculations are practical and yield acceptable computer times.

For demonstration purposes a possible alternative for overflow abatement was chosen to consist of one basin, three combined sewer system overflows, and one control gate. The dry-weather or combined sewer flows are directed by this system to a sewage treatment plant, the effluent of which is pumped to the receiving water. The sewers and the basin of the system provide substantial inline storage. The runoff from the area AC28 entering the main and trunk sewer system is throttled by a control gate, the operation of which is dependent on the water depth at the node C034. Assuming that AC28 is a projected new development area that later on might require its own new treatment plant, the area shall not, in the meantime, be allowed to overload the old system.

Preparation of the network, quantity and quality files of the input data may be aided by applying the program DTCHCK, the error meassages of which speed debugging of the input data prepared. The input data as prepared for DTCHCK for this demonstration are provided in Appendix 7.

The derivation and calibration of input data such as unit hydrographs and pollutographs may be made especially for present conditions, using the program QQSEGL, which simulates runoff quantities and qualities from individual drainage areas. For drainage area AC01, it was assumed that runoff measurements were available. An input and output example of the program QQSEGL is included in Appendix 6 for a case where calculated flows, BOD_5, and TSS loads were compared with measured data.

For final definition of the unit hydrographs and pollutographs the program QQSEGL is applied repetitively until satisfactory runoff calculations are obtained for the measured events available. Careful checking of the measured data and of the boundary conditions for the individual events investigated helps to avoid calibration of input data against wrong measurements or under false assumptions.

The calibration of input data may be extended to the main and trunk sewer system if measured runoff data from this system are available. Therefore, single event simulations are performed using the sequence of programs DTCHCK, DWTFLC, TXFCE, RCVRIN, MNTWKC, and MNTSWP. Because the example chosen represents an abatement alternative, single event simulations of the runoff in the sewer system is further discussed below. Repetitive application of the program sequence, comparison of the calculated runoff with measurements and adjustment of input data lead to a final input data set.

For the final calibration it should be understood that the intention of the model is not to picture the system geometry exactly but to represent the approximate runoff and overflow behavior of the system. Therefore, the sewer network may be abstracted and roughness coefficients of individual sewer segments, overflow weir heights and even profile dimensions may be adapted to achieve this goal.

VERIFICATION

Verification of the program package is usually accomplished by comparing the calculated runoff of the individual drainage areas and of the system as a whole with measured dry-weather flows and rainfall-runoff data. Because verification of runoff behavior of the total system to a similar extent for all different magnitudes of precipitation events may prove difficult, emphasis should be given to those precipitation events that would usually cause overflows or overloading, conditions that are supposed to be abated or avoided by the alternatives in mind.

ABATEMENT ALTERNATIVES

Abatement alternatives usually are developed starting from present conditions. To save computing time, the effectiveness of different abatement schemes may be tested by relative comparisons of the calculated runoff and overflow behavior. This approach usually is on the basis of synthetic storms or real storms considered critical for the loading of the system. Also, in this context continuous and single event simulation results may be combined (2). As an example of single event runoff simulations of the overall system, a set of input and output data is contained in Appendices 8, 9 and 10. Final choice of an abatement alternative is based on technical evaluation and cost figures associated with the different schemes.

PROBLEM ASSESSMENT AND VIOLATION OF GUIDELINES AND STANDARDS

A problem can conclusively be assessed and violation of guidelines and standards can be demonstrated only by a continuous investigation of the precipitation-runoff-overflow behavior of the entire system as explained in Volume I (Model Description, Testing, and Applications; Section 1, Introduction). Therefore, the above-named sequence of programs is used for sewer system runoff simulations with continuous rainfall records. However, instead of the program MNTWSP, which provided the output of runoff hydrographs for single event simulations, the multitude of output data produced by a continuous simulation is statistically analyzed by the program STATCS. For continuous simulations, aside from the precipitation data and data card 2 of the program DTCHCK: Network data, the input is similar to the input necessary for single event simulations. The additional input data required for the statistics program STATCS and output samples of this program are provided in Appendix 11. As far as monthly or annual totals are concerned, the ratios of total runoff to overflow figures, comparing for instance present and future (abated) conditions, are more informative than the absolute values are.

For assessment of runoff and overflow behavior, simulation of continuous records of as long as 20 years duration was not found to be necessary. Selection of 4 to 6 representative years from a long continuous precipitation record has proved beneficial for runoff simulation purposes. This selection is aided by statistical analysis of the precipitation data. If for statistical key properties the statistical analysis of the complete rainfall record yields similar results as the statistical analysis of the years selected does the shorter precipitation record may be used as the continuous runoff simulation input. Statistical analysis of precipitation data is done by the program RAINSC. See Appendix 12 for input and output examples. However, the years used in the examples were selected arbitrarily and are not necessarily the best choice.

REFERENCES

1. Geiger, W. F. Urban Runoff Pollution Derived from Long-Time Simulation. In: Proceedings of the National Symposium on Urban Hyrodolgy and Sediment Control, Lexington, Kentucky, 1975. pp. 259-270.

2. Geiger, W. F., S. A. la Bella and G. C. Mc Donald. Overflow Abatement Alternatives Selected by Combining Continuous and Single Event Simulations. In: Proceedings of the National Symposium on Urban Hydrology, Hydraulics and Sediment Control, Lexington, Kentucky, 1976. pp. 71-79.

3. HEC1. Flood Hydrograph Package. Users Manual. The Hydrologic Engineering Center, Davis, California, 1973. 25 pp.

APPENDIX 1

DATA CARDS FOR QQSEGL

PROGRAM QQSEGL: Input data

SUMMARY OF DATA CARDS:

DATA CARD	1 :	Extent of simulations

PART 1: QUANTITY

DATA CARD	2a:	Number of precipitation intervals
DATA CARD(S)	2b:	Precipitation intensities
DATA CARD	3 :	Losses
DATA CARD	4a:	Number of unit hydrograph ordinates
DATA CARD(S)	4b:	Unit hydrograph impervious areas
DATA CARD(S)	4c:	Unit hydrograph pervious areas
DATA CARD	5 :	Drainage area characteristics
DATA CARD(S)	6 :	Measured runoff

PART 2: QUALITY

DATA CARD	7 :	Number of pollutants
DATA CARD	8 :	Starting interval
DATA CARD	9a:	Number of unit pollutant load hydrograph ordinates
DATA CARD	9b:	Conversion and area factors
DATA CARD(S)	9c:	Unit pollutant load hydrograph for pollutant 1
DATA CARD(S)	9d:	Unit pollutant load hydrograph for pollutant 2
DATA CARDS	10a:	Diurnal variation influence for pollutant 1
DATA CARDS	10b:	Diurnal variation influence for pollutant 2
DATA CARDS	11a:	Influence of rainfall duration on pollutant 1
DATA CARDS	11b:	Influence of rainfall duration on pollutant 2
DATA CARD(S)	12a:	Measured load of pollutant 1
DATA CARD(S)	12b:	Measured load of pollutant 2
DATA CARD	13 :	Amount of pollution at start of rainfall

NOTE: PROGRAM QQSEGL only allows for metric input. Special provision for input of bacteria counts is not made.

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A Fortran F-format (real numbers) is required, if a decimal point is shown in the space under consideration. The location of the decimal point as indicated is not binding and may be adjusted to fit the number into the space available. However, all real numbers must be provided including their decimal points. A Fortran I-format (integer numbers) is requested, if no decimal point is shown in the space under consideration. All integer numbers must be right adjusted within the space provided.

Symbols contained in the format box, but not individually explained, must be punched as shown. All blanks within a field shown in the format box are interpreted as zeros.

Symbols used in the format boxes coordinate the explanations given on the data cards only and do not necessarily match the symbols used in the equations of Section 2 of Volume I (Model Description, Testing, and Applications).

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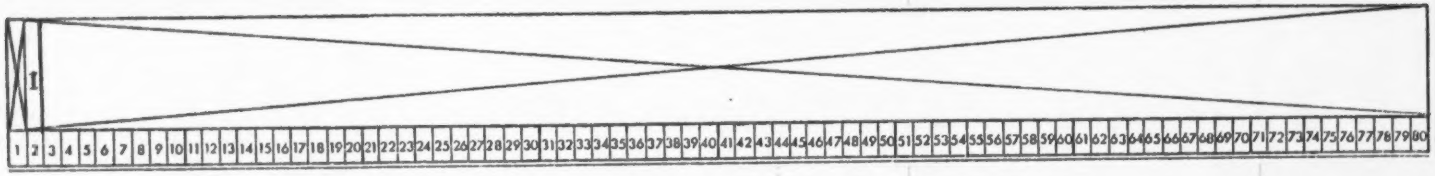
PROGRAM QQSEGL

DATA CARD 1: Extend of simulations

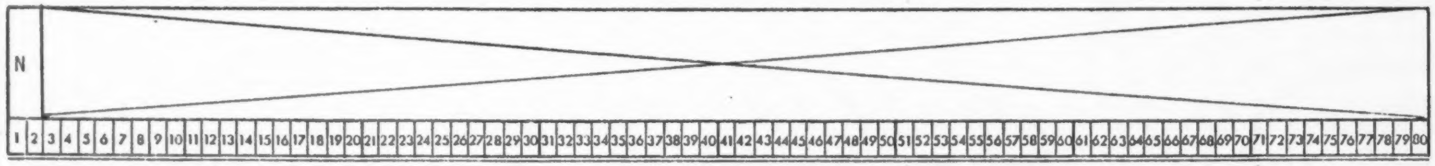

I
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: I 0 Runoff quantity only is computed. DATA CARDS 1 to 6 must be supplied

1 Runoff quantity and quality are computed. DATA CARDS 1 to 13 must be supplied

PROGRAM QQSEGL

DATA CARD 2a: Number of precipitation intervals


N
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:	N	Number of precipitation intervals (≦ 99) One interval has a duration of 5 minutes

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PROGRAM QQSEGL

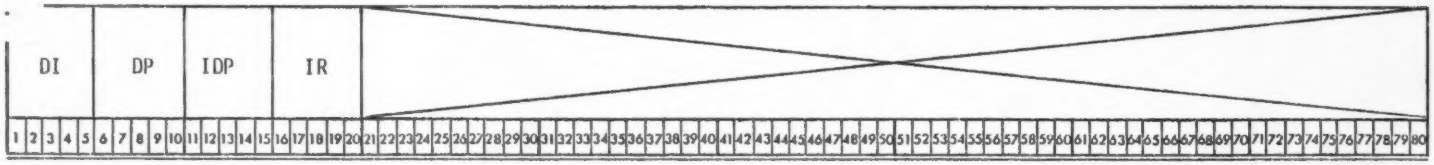
DATA CARD(S) 2b: Precipitation intensities

IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN
1 2 3 4 5	6 7 8 9 10	11 12 13 14 15	16 17 18 19 20	21 22 23 24 25	26 27 28 29 30	31 32 33 34 35	36 37 38 39 40	41 42 43 44 45	46 47 48 49 50	51 52 53 54 55	56 57 58 59 60	61 62 63 64 65	66 67 68 69 70	71 72 73 74 75	76 77 78 79 80

EXPLANATIONS: IN Precipitation intensities in $\frac{1}{1,000}\ \frac{\text{mm}}{5\ \text{min}}$

(Continue up to 7 cards)

DATA CARD 3: Losses


DI
DP
IDP
IR
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:

DI	Maximum initial losses for impervious areas in $\frac{1}{1,000}$ mm
DP	Maximum initial losses for pervious areas in $\frac{1}{1,000}$ mm
IDP	Initial losses at start of calculation for pervious areas in $\frac{1}{1,000}$ mm
IR	Final constant rate of infiltration in $\frac{1}{1,000}\,\frac{\text{mm}}{5\text{ min}}$

NOTE:

The initial losses include initial evaporation, wetting losses, depression capacities on the oversurfaces and initial losses within the drainage system of the catchments. For pervious areas in addition the initial rate of infiltration capacity above the final constant rate is included in the initial losses.

Dependent on surface roughness and land use the initial losses for impervious areas vary from 0.5 to 3.0 mm. The infiltration for pervious areas may be as much as 12.0 mm. Some reference values are given on DATA CARD 5 of PROGRAM DTCHCK: Quantity data in Appendix 2.

The initial losses at the start of a calculation must be smaller than the maximum initial losses provided. The value must be valid for the start of rainfall.

The final constant rate of infiltration may vary substantially and is mainly dependent on the perviousness of the top soil layer. For some reference values see DATA CARD 6 of PROGRAM DTCHCK: Quantity data in Appendix 2.

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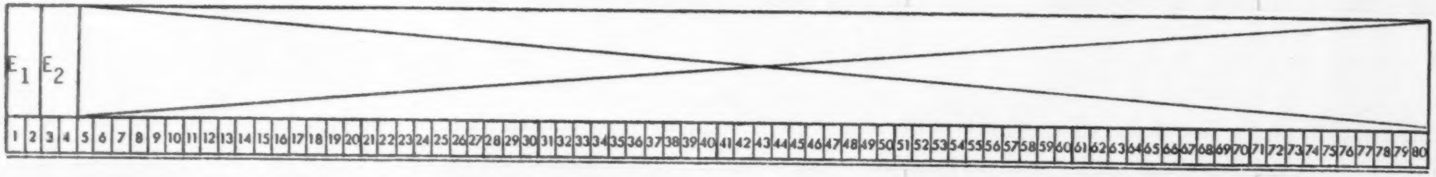
PROGRAM QQSEGL

DATA CARD 4a: Number of unit hydrograph ordinates


E_1
E_2
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:

E_1 Number of unit hydrograph ordinates for impervious areas ($\leq$ 30)

E_2 Number of unit hydrograph ordinates for pervious areas ($\leq$ 30)

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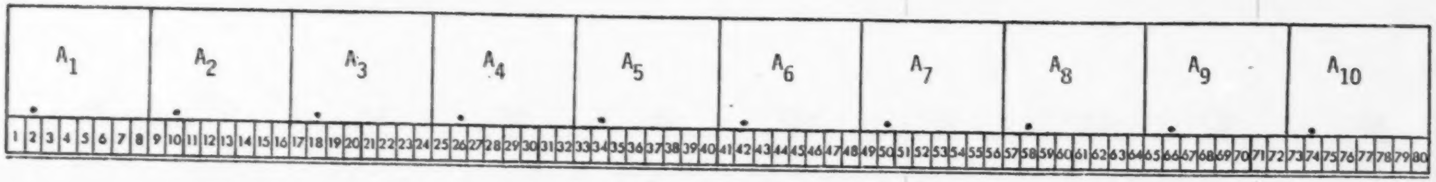
PROGRAM QQSEGL

DATA CARD(S) 4b: Unit hydrograph impervious areas


A_1
A_2
A_3
A_4
A_5
A_6
A_7
A_8
A_9
A_{10}
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: A_i Dimensionless ordinates of the unit hydrograph for impervious areas (5-minute intervals). A maximum of 30 values may be given.

NOTE: The sum of all ordinates of one unit hydrograph must be 1.0.

The unit hydrographs may be derived from rainfall-runoff measurements or synthetic unit hydrographs may be used. The values as contained in Appendix 6, Test Example for PROGRAM QQSEGL, are not generally transferable on other areas, as the shape of the unit hydrographs is dependent on catchment size, shape, slope, land use and other characteristics.

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PROGRAM QQSEGL DATA CARD(S) 4c: Unit hydrograph pervious areas

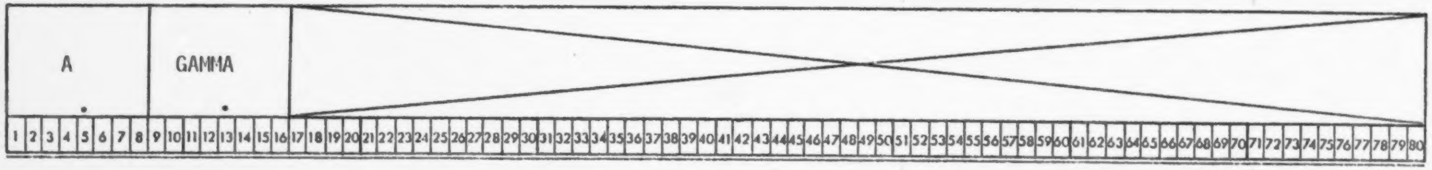
B_1	B_2	B_3	B_4	B_5	B_6	B_7	B_8	B_9	B_{10}
1 2 3 4 5 6 7 8	9 10 11 12 13 14 15 16	17 18 19 20 21 22 23 24	25 26 27 28 29 30 31 32	33 34 35 36 37 38 39 40	41 42 43 44 45 46 47 48	49 50 51 52 53 54 55 56	57 58 59 60 61 62 63 64	65 66 67 68 69 70 71 72	73 74 75 76 77 78 79 80

EXPLANATIONS: B_i Dimensionless ordinates of the unit hydrograph for pervious areas (5-minute intervals). A maximum of 30 values may be given.

NOTE: The sum of all ordinates of one unit hydrograph must be 1.0.

The unit hydrographs may be derived from rainfall-runoff measurements or synthetic unit hydrographs may be used. The values as contained in Appendix 6, Test Example for PROGRAM QQSEGL, are not generally transferable on other areas, as the shape of the unit hydrographs is dependent on catchment size, shape, slope, land use and other characteristics.

PROGRAM QQSEGL DATA CARD 5: Drainage area characteristics


A
GAMMA
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:		
	A	Size of drainage area in ha
	GAMMA	Ratio of imperviousness in percent of total area

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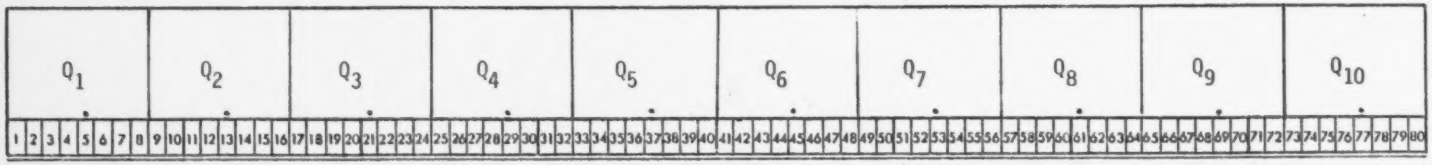
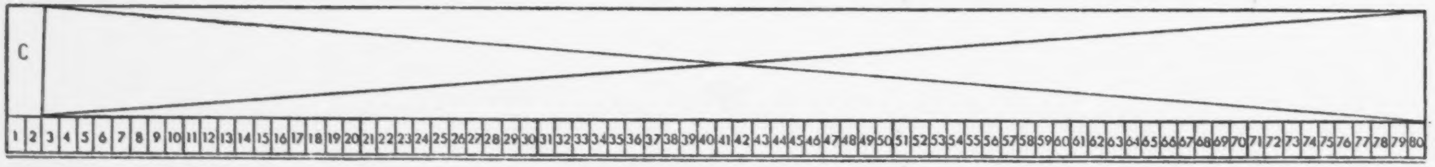
PROGRAM QQSEGL DATA CARD(S) 6: Measured runoff


Q_1
Q_2
Q_3
Q_4
Q_5
Q_6
Q_7
Q_8
Q_9
Q_{10}
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: Q_i Measured runoff not including dry-weather flow in m^3/s

NOTE: The number of values supplied must be equal to the number of precipitation intervals provided on DATA CARD(S) 2b of PROGRAM QQSEGL + the larger number of unit hydrograph ordinates given on DATA CARD(S) 4b or 4c of PROGRAM QQSEGL +1.

PROGRAM QQSEGL DATA CARD 7: Number of pollutants

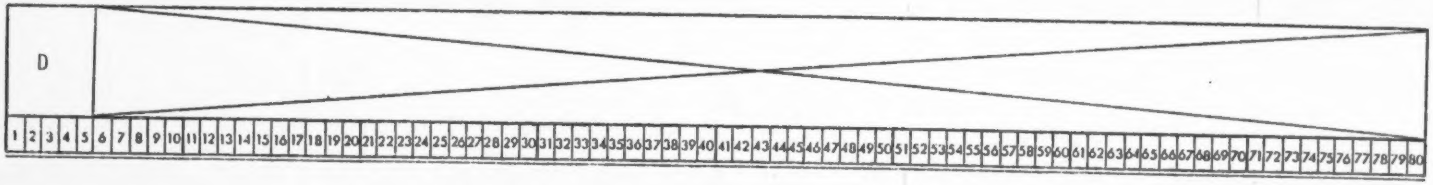

C
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:	C	Total number of pollutants (1 or 2)

NOTE: One or two pollutants may be investigated in one run with PROGRAM QQSEGL.

PROGRAM QQSEGL

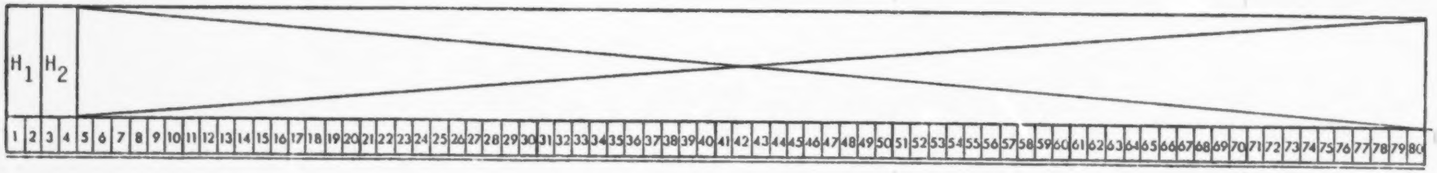
DATA CARD 8: Starting interval


D
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: D 5-minute interval of day, where precipitation starts, e.g. 150 for 12.30 (hr.min)

PROGRAM QQSEGL

DATA CARD 9a: Number of unit pollutant load hydrograph ordinates


H_1
H_2
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

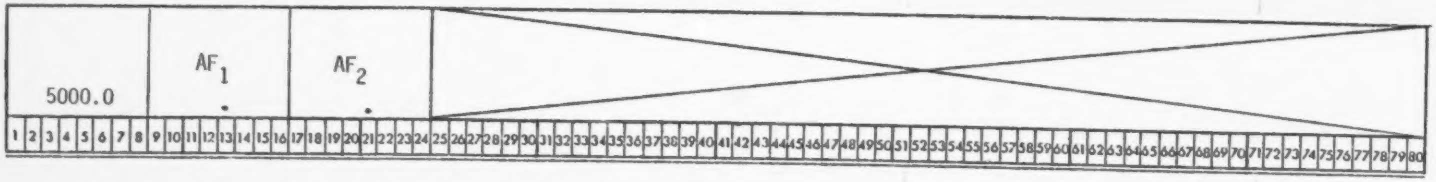
EXPLANATIONS:

H_1	Number of unit pollutant load hydrograph ordinates for pollutant 1
H_2	Number of unit pollutant load hydrograph ordinates for pollutant 2

NOTE: The number of pollutant load unit hydrograph ordinates must be equal or smaller than the smaller number of unit hydrograph ordinates given on DATA CARD(S) 4b or 4c of PROGRAM QQSEGL.

PROGRAM QQSEGL

DATA CARD 9b: Conversion and area factors


5000.0
AF1 .
AF2 .
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:

AF_1	Dimensionless area factor for pollutant 1 (usually 1.0)
AF_2	Dimensionless area factor for pollutant 2 (usually 1.0)

NOTE: The area factors multiply with the ordinates of the unit pollutant load hydrographs as given on DATA CARDS 9c and 9d of PROGRAM QQSEGL. This feature is provided to allow for quick variation of the unit pollutant load hydrographs during the calibration process.

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PROGRAM QQSEGL

DATA CARD(S) 9c: Unit pollutant load hydrograph for pollutant 1

P_{11}	P_{12}	P_{13}	P_{14}	P_{15}	P_{16}	P_{17}	P_{18}	$P_{1..}$	P_{1n}
.	.	.	.	.	.	.	.	.	.
1 2 3 4 5 6 7 8	9 10 11 12 13 14 15 16	17 18 19 20 21 22 23 24	25 26 27 28 29 30 31 32	33 34 35 36 37 38 39 40	41 42 43 44 45 46 47 48	49 50 51 52 53 54 55 56	57 58 59 60 61 62 63 64	65 66 67 68 69 70 71 72	73 74 75 76 77 78 79 80

EXPLANATIONS: P_{1i} Ordinates of the unit pollutant load hydrograph for pollutant 1

NOTE: The number of pollutant load unit hydrograph ordinates must be equal or smaller than the smaller number of unit hydrograph ordinates given on DATA CARD(S) 4b or 4c of PROGRAM QQSEGL.

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PROGRAM QQSEGL

DATA CARD(S) 9d: Unit pollutant load hydrograph for pollutant 2

P_{21} .	P_{22} .	P_{23} .	P_{24} .	P_{25} .	P_{26} .	P_{27} .	P_{28} .	$P_{2..}$.	P_{2n} .
1 2 3 4 5 6 7 8	9 10 11 12 13 14 15 16	17 18 19 20 21 22 23 24	25 26 27 28 29 30 31 32	33 34 35 36 37 38 39 40	41 42 43 44 45 46 47 48	49 50 51 52 53 54 55 56	57 58 59 60 61 62 63 64	65 66 67 68 69 70 71 72	73 74 75 76 77 78 79 80

EXPLANATIONS: P_{2i} Ordinates of the unit pollutant load hydrograph for pollutant 2

NOTE: The number of pollutant load unit hydrograph ordinates must be equal or smaller than the smaller number of unit hydrograph ordinates given on DATA CARD(S) 4b or 4c of PROGRAM QQSEGL.

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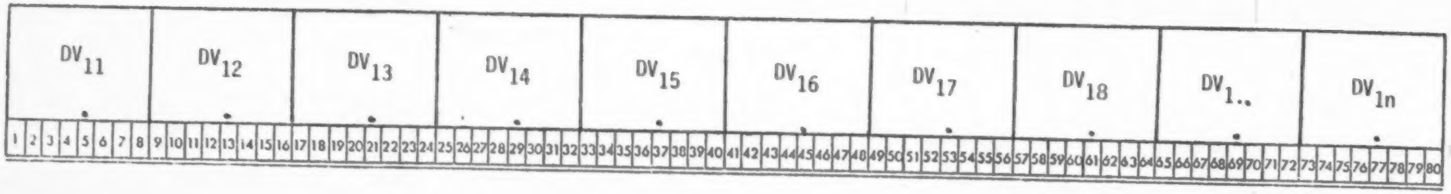
PROGRAM QQSEGL

DATA CARDS 10a: Diurnal variation influence for pollutant 1


DV11
DV12
DV13
DV14
DV15
DV16
DV17
DV18
DV1..
DV1n
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: DV_{1i} Dimensionless influence factor for the time of day on pollutant 1 $(0.0 \leqq D_{1i} \leqq 1.0)$

NOTE: 48 subsequent values starting at midnight are necessary, each representing half an hour.

The change in land use conditions during the day (e.g. traffic conditions) may be accounted by the diurnal variation influence factor. For BOD_5, COD and TSS for instance DV_{1i} usually is 1.0 during rush hours and decreases to 0.8 for night time traffic.

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PROGRAM QQSEGL

DATA CARDS 10b: Diurnal variation influence for pollutant 2

DV_{21} .	DV_{22} .	DV_{23} .	DV_{24} .	DV_{25} .	DV_{26} .	DV_{27} .	DV_{28} .	$DV_{2..}$.	DV_{2n} .
1 2 3 4 5 6 7 8	9 10 11 12 13 14 15 16	17 18 19 20 21 22 23 24	25 26 27 28 29 30 31 32	33 34 35 36 37 38 39 40	41 42 43 44 45 46 47 48	49 50 51 52 53 54 55 56	57 58 59 60 61 62 63 64	65 66 67 68 69 70 71 72	73 74 75 76 77 78 79 80

EXPLANATIONS: DV_{2i} Dimensionless influence factor of the time of day on pollutant 2 ($0.0 \leq DV_{2i} \leq 1.0$)

NOTE: 48 subsequent values starting at midnight are necessary, each representing half an hour.

The change in land use conditions during the day (e.g. traffic conditions) may be accounted by the diurnal variation influence factor. For BOD_5, COD and TSS for instance DV_{2i} usually is 1.0 during rush hours and decreases to 0.8 for night time traffic.

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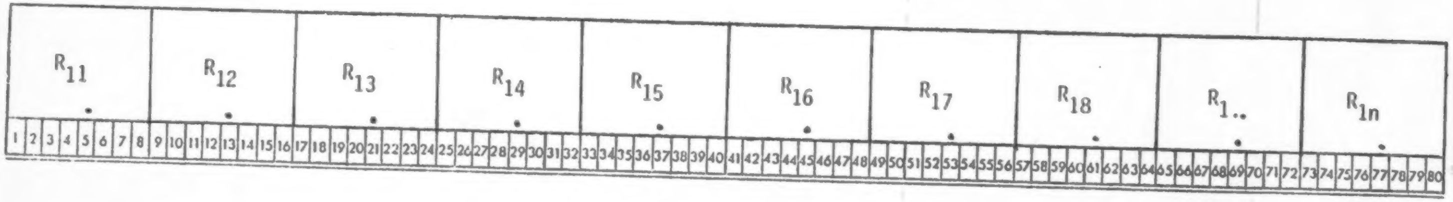
TYPING GUIDE SHEET

PROGRAM QQSEGL

DATA CARDS 11a: Influence of rainfall duration on pollutant 1


R11
R12
R13
R14
R15
R16
R17
R18
R1..
R1n
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: R_{1i} Dimensionless influence factor of rainfall duration on pollutant 1 ($0.0 \leq R_{1i} \leq 1.0$)

NOTE: 20 values are necessary (5-minute intervals).

The ability of a rainfall intensity to wash off pollutants is decreasing with increasing rainfall duration. At the beginning of a rainfall $R_{1i} = 1.0$. After 90 minutes R_{1i} usually decreases to 0.2 to 0.4. The figures provided in Appendix 7, Test Example for PROGRAM DTCHCK, may be used as reference values.

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PROGRAM QQSEGL

DATA CARDS 11b: Influence of rainfall duration on pollutant 2

R_{21}	R_{22}	R_{23}	R_{24}	R_{25}	R_{26}	R_{27}	R_{28}	$R_{2..}$	R_{2n}
.	.	.	.	.	.	.	.	.	.
1 2 3 4 5 6 7 8	9 10 11 12 13 14 15 16	17 18 19 20 21 22 23 24	25 26 27 28 29 30 31 32	33 34 35 36 37 38 39 40	41 42 43 44 45 46 47 48	49 50 51 52 53 54 55 56	57 58 59 60 61 62 63 64	65 66 67 68 69 70 71 72	73 74 75 76 77 78 79 80

EXPLANATIONS: R_{2i} Dimensionless influence of rainfall duration on pollutant 2 $(0.0 \leqq R_{2i} \leqq 1.0)$

NOTE: 20 values are necessary (5-minute intervals).

The ability of a rainfall intensity to wash off pollutants is decreasing with increasing rainfall duration. At the beginning of a rainfall $R_{2i} = 1.0$. After 90 minutes R_{2i} usually decreases to 0.2 to 0.4. The figures provided in Appendix 7, Test Example for PROGRAM DTCHCK, may be used as reference values.

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PROGRAM QQSEGL

DATA CARD(S) 12a: Measured load of pollutant 1

MP_{11}	MP_{12}	MP_{13}	MP_{14}	MP_{15}	MP_{16}	MP_{17}	MP_{18}	$MP_{1..}$	MP_{1n}
.	.	.	.	.	.	.	.	.	.
1 2 3 4 5 6 7 8	9 10 11 12 13 14 15 16	17 18 19 20 21 22 23 24	25 26 27 28 29 30 31 32	33 34 35 36 37 38 39 40	41 42 43 44 45 46 47 48	49 50 51 52 53 54 55 56	57 58 59 60 61 62 63 64	65 66 67 68 69 70 71 72	73 74 75 76 77 78 79 80

EXPLANATIONS: MP_{1i} Measured runoff load of pollutant 1 not including dry-weather flow in kg/5 min

NOTE: The number of values supplied must be equal to the number of precipitation intervals provided on DATA CARD(S) 2b of PROGRAM QQSEGL + the larger number of unit pollutant load hydrograph ordinates given on DATA CARD(S) 9c or 9d of PROGRAM QQSEGL +1.

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PROGRAM QQSEGL

DATA CARD(S) 12b: Measured load of pollutant 2

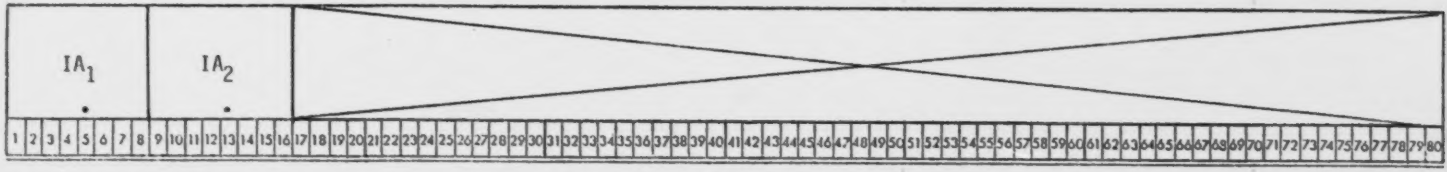
MP_{21}	MP_{22}	MP_{23}	MP_{24}	MP_{25}	MP_{26}	MP_{27}	MP_{28}	$MP_{2..}$	MP_{2n}
.	.	.	.	.	.	.	.	.	.
1 2 3 4 5 6 7 8	9 10 11 12 13 14 15 16	17 18 19 20 21 22 23 24	25 26 27 28 29 30 31 32	33 34 35 36 37 38 39 40	41 42 43 44 45 46 47 48	49 50 51 52 53 54 55 56	57 58 59 60 61 62 63 64	65 66 67 68 69 70 71 72	73 74 75 76 77 78 79 80

EXPLANATIONS: MP_{2i} Measured runoff load of pollutant 2 not including dry-weather flow in kg/5 min

NOTE: The number of values supplied must be equal to the number of precipitation intervals provided on DATA CARD(S) 2b of PROGRAM QQSEGL + the larger number of unit pollutant load hydrograph ordinates given on DATA CARD(S) 9c or 9d of PROGRAM QQSEGL +1.

PROGRAM QQSEGL

DATA CARD 13: Amount of pollution at start of rainfall


IA1
IA2
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:	IA_1	Initial amount of pollution for pollutant 1 in kg/ha
	IA_2	Initial amount of pollution for pollutant 2 in kg/ha

NOTE: The initial amount of pollution is the pollution available for wash-off at the start of rainfall.

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APPENDIX 2

DATA CARDS FOR DTCHCK

PROGRAM DTCHCK: Precipitation data

DATA CARD 1 : Title card
DATA CARD 2 : Year card
DATA CARD 3 : Month card
DATA CARDS 4 : Type-of-event cards
DATA CARDS 5 : Precipitation cards
DATA CARD 6 : End card
DATA CARD 7 : End card

NOTE: Precipitation data according to these specifications are supplied only for continuous simulations. For single event simulations the precipitation data enter PROGRAM DTCHCK on DATA CARDS 4 of the network data.

R and S at the upper right of each data card description specifies if the data card(s) must be included for separate and combined sewer system (S) and/or for receiving water system (R) simulations.

If the format box on top of each data card description is subdivided, the upper part describes the input in english, the lower part in metric units.

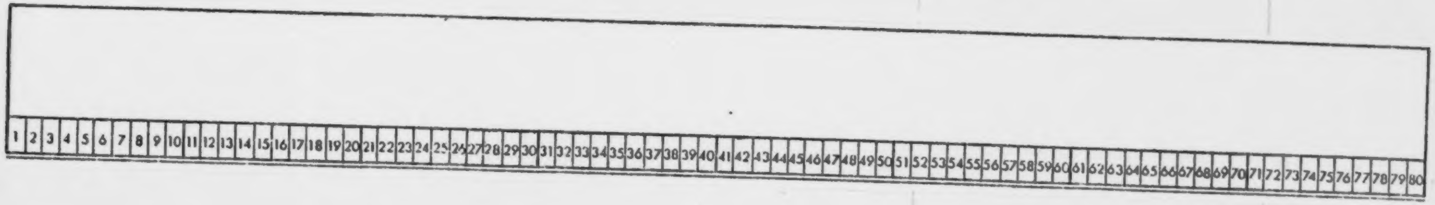
A Fortran F-format (real numbers) is required, if a decimal point is shown in the space under consideration. The location of the decimal point as indicated is not binding and may be adjusted to fit the number into the space available. However, all real numbers must be provided including their decimal points. A Fortran I-format (integer numbers) is requested, if no decimal point is shown in the space under consideration. All integer numbers must be right adjusted within the space provided.

Symbols contained in the format box, but not individually explained, must be punched as shown.

Symbols used in the format boxes coordinate the explanations given on the data cards only and do not necessarily match the symbols used in the equations of Section 2 of Volume I (Model Description, Testing, and Applications).

S

PROGRAM DTCHCK: Precipitation data **DATA CARD 1:** Title card



EXPLANATIONS: Any text with up to 80 alphanumeric characters may be inserted.

NOTE: This card must be identical with the title cards of the network, quantity and quality data.

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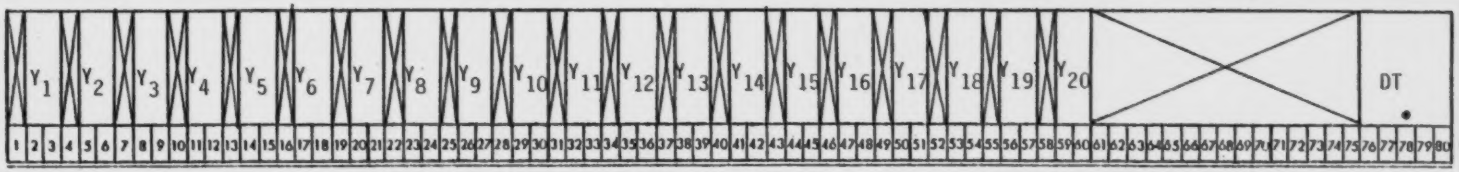
PROGRAM DTCHCK: Precipitation data DATA CARD 2: Year card S


Y_1
Y_2
Y_3
Y_4
Y_5
Y_6
Y_7
Y_8
Y_9
Y_{10}
Y_{11}
Y_{12}
Y_{13}
Y_{14}
Y_{15}
Y_{16}
Y_{17}
Y_{18}
Y_{19}
Y_{20}
DT
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:	Y_i	Year, e.g. 78 for 1978 in increasing sequence
	DT	Duration of a time interval in minutes, 5.0 must be entered

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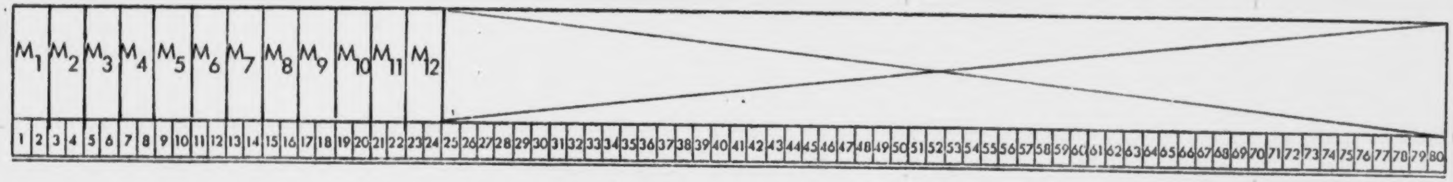
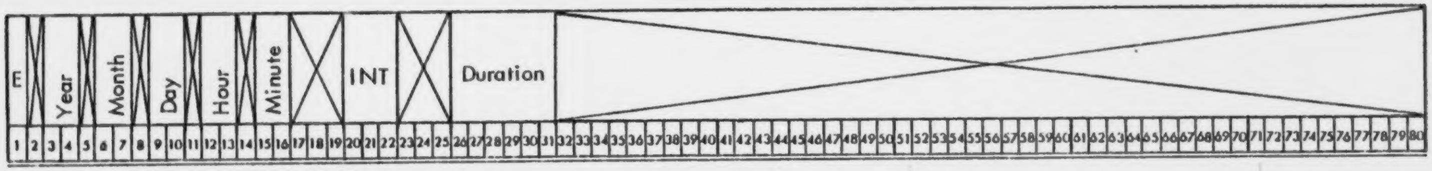
PROGRAM DTCHCK: Precipitation data DATA CARD 3: Month card

S


M_1
M_2
M_3
M_4
M_5
M_6
M_7
M_8
M_9
M_{10}
M_{11}
M_{12}
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: M_i Month, in increasing sequence starting in the first space, e.g. 9 for September

PROGRAM DTCHCK: Precipitation data DATA CARDS 4: Type-of-event-cards S


E
Year
Month
Day
Hour
Minute
INT
Duration
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:

E	Type of event	0	dry spell
		1	rainfall event (cards containing the relevant precipitation intensities must follow)
Year Month Day Hour Minute	Starting time of the individual event using a 24 hour clock		
INT	Number of interval of day at which the event starts, one interval being of 5 minutes duration		
DURATION	Duration of event in intervals		

NOTE: At the end of an individual year or of a calculation period in a year a dry spell card must be provided covering the whole time span until the start of the first precipitation to be simulated in the next year or calculation period in a year, not accounting, however, for total years missing.

A complete precipitation series, however, ends with a rainfall event.

The calculation periods in the different years must match, e.g. always May through September.

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PROGRAM DTCHCK: Precipitation data **DATA CARDS 5:** Precipitation cards

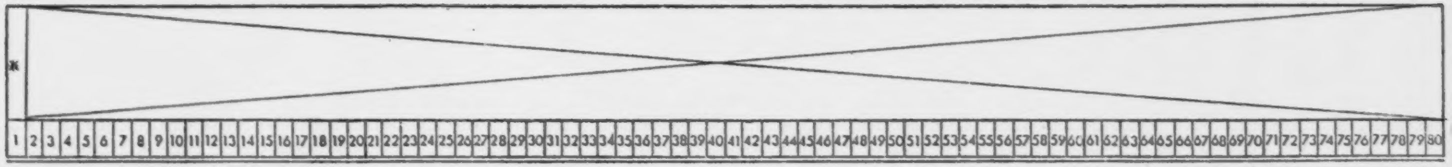
S

R_1	R_2	R_3	R_4	R_5	R_6	R_7	R_8	R_9	R_{10}	R_{11}	R_{12}	R_{13}	R_{14}	$R_{..}$	R_n
1 2 3 4 5	6 7 8 9 10	11 12 13 14 15	16 17 18 19 20	21 22 23 24 25	26 27 28 29 30	31 32 33 34 35	36 37 38 39 40	41 42 43 44 45	46 47 48 49 50	51 52 53 54 55	56 57 58 59 60	61 62 63 64 65	66 67 68 69 70	71 72 73 74 75	76 77 78 79 80

EXPLANATIONS: R_i Amount of rainfall within the (5-minute) time interval DT in 1/1,000 mm

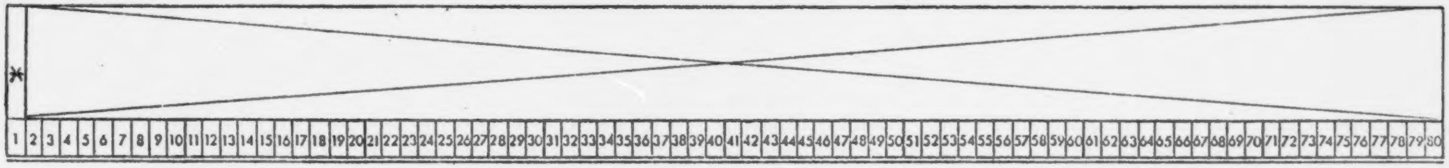
NOTE: There is no limit to the number of values supplied using sequential cards. Precipitation cards only follow subsequently to a type-of-event card indicating E = 1 (DATA CARDS 4 of PROGRAM DTCHCK: Precipitation data).

PROGRAM DTCHCK: Precipitation data DATA CARD 6: End card S


*
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: The end of a precipitation series comprising of several years or of several calculation periods in different years is marked by this card. For a second and third precipitation series DATA CARDS 4 to 6 of PROGRAM DTCHCK are repeated: Precipitation data may follow.

PROGRAM DTCHCK: Precipitation data **DATA CARD 7:** End card S


*
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: The very last precipitation series supplied is marked in addition by this second end card.

PROGRAM DTCHCK: Network (and drainage area) data

DATA CARD	1 :	Title card
DATA CARD	2 :	Constant card
DATA CARD(S)	3a:	Printout segments
DATA CARD	3b:	End of printout segments
DATA CARD(S)	3c:	Printout nodes, overflow structures (OS)
DATA CARD	3d:	End of printout nodes, overflow structures (OS)
DATA CARD	3e:	Printout nodes, basins (RS)
DATA CARD	3f:	End of printout nodes, basins (RS)
DATA CARD	3g:	Special nodes of interest
DATA CARDS	3h:	Nodes of interest
DATA CARD	3i:	Boundary nodes (constant loading)
DATA CARD	3j:	Boundary nodes (variable loading)
DATA CARDS	4 :	Precipitation intensities
DATA CARD(S)	5a:	Segment cards
DATA CARD	5b:	End card
DATA CARD(S)	6a:	Special structure type 1, overflow structure (OS)
DATA CARD(S)	6b:	Special structure type 2, flooded detention basin (RS)
DATA CARD(S)	6c:	Special structure type 3, pump drained basin (RS)
DATA CARD	6d:	End card
DATA CARD(S)	7a:	Control gate type 1
DATA CARD(S)	7b:	Control gate type 2
DATA CARD	7c:	End card
DATA CARD(S)	8a:	Drainage areas
DATA CARD	8b:	End card

NOTE: This data set containing network and drainage area data, constant cards and regulating information also is briefly called "Network data".

R and S at the upper right of each data card description specifies if the data card(s) must be included for separate and combined sewer system (S) and/or for receiving water system (R) simulations.

If the format box on top of each data card description is subdivided, the upper part describes the input in english, the lower part in metric units.

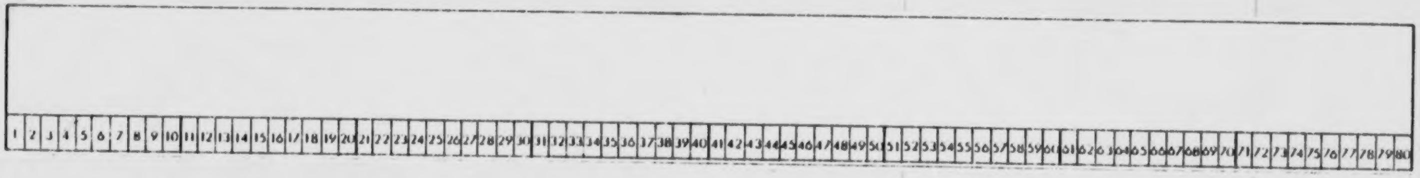
A Fortran F-format (real numbers) is required, if a decimal point is shown in the space under consideration. The location of the decimal point as indicated is not binding and may be adjusted to fit the number into the space available. However, all real numbers must be provided including their decimal points. A Fortran I-format (integer numbers) is requested, if no decimal point is shown in the space under consideration. All integer numbers must be right adjusted within the space provided.

Symbols contained in the format box, but not individually explained, must be punched as shown.

Symbols used in the format boxes coordinate the explanations given on the data cards only and do not necessarily match the symbols used in the equations of Section 2 of Volume I (Model Description, Testing, and Applications).

PROGRAM DTCHCK: Network data **DATA CARD 1:** Title card

R
S


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: Any text with up to 80 alphanumeric characters may be inserted.

NOTE: This card must be identical with the title cards of the precipitation, quantity and quality data.

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R
S

PROGRAM DTCHCK: Network data DATA CARD 2: Constant card

											START					END											
DATE	PS	N	WCF	IWF	PF_1	PF_2	PF_3	PF_4		C	Day	Month	Year	Hour	Minute	Day	Month	Year	Hour	Minute	INT	DT	TEST	RW	PRUEF	LAN	MET
1–10	11	12–16	17–20	21–24	25–28	29–32	33–36	37–40	41–49	50	51–52	53–54	55–56	57–58	59–60	61–62	63–64	65–66	67–68	69–70	71–73	74–75	76	77	78	79	80

EXPLANATIONS:

DATE	Up to 10 characters, e.g. 10/25/1974 or OCT.25,74; if blank, the current machine date will be used.
PS	Number of precipitation series considered in the project, e.g. 1, 2 or 3
N	General value for Manning's n , dimensionless (0.007 ≦ N ≦ 0.1) It holds good for all sewer segments that are not provided with an individual value on DATA CARD(S) 5a of PROGRAM DTCHCK: Network data
WCF	Prognosis factor for water consumption, dimensionless (0.1 ≦ WCF ≦ 10.0). The value provided here serves as default value for WCF on DATA CARD(S) 8a of PROGRAM DTCHCK: Network data. WCF is used to multiply DWF on DATA CARDS 10a of PROGRAM DTCHCK: Quantity data. For normal applications 1.0 is suggested.
IWF	Prognosis factor for industrial wastewater, dimensionless (0.1 ≦ IWF ≦ 10.0). The value provided here serves as default value for IWF on DATA CARD(S) 8a of PROGRAM DTCHCK: Network data. IWF is used to multiply IW on DATA CARD(S) 8a of PROGRAM DTCHCK: Network data. For normal applications 1.0 is suggested.
PF_i	Prognosis factor for the amount of pollutant i contained in dry weather flow, dimensionless ($0.1 \leqq PF_i \leqq 10.0$). PF_i is used to multiply AP_i on DATA CARDS 11a of PROGRAM DTCHCK: Quality data. For normal applications 1.0 is suggested.

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PROGRAM DTCHCK: Network data DATA CARD 2: Constant card continued

EXPLANATIONS:

C	Condition	1	single event simulation; precipitation intensities are read in by way of DATA CARDS 4 of PROGRAM DTCHCK: Network data
		3	continuos simulation; precipitation intensities are read in as a separate data set (PROGRAM DTCHCK: Precipitation data)
START	Starting date and time of event(s) simulated, e.g. Day = 1, Months = 5, Year = 76, Hour = 13 and Minute = 25		
END	Ending date and time of event(s) simulated, only supplied for C = 3, e.g. 31, 10, 77, 23 and 55		
INT	Number of intervals of single event to be simulated, only for C = 1. A maximum number of 288 intervals is allowed		
DT	Duration of time step, 5 minutes must be used, i.e. 5		
TEST	blank	no test printout	
	T	test printout	
RW	blank or 0	in the run anticipated a sewer network is calculated	
	1	in the run anticipated one receiving water system is calculated	
	2	in the run anticipated two independent receiving water systems are calculated	
PRUEF	blank or 0	the project only comprises a sewer network	
	1	the project comprises both, sewer network and receiving water system(s)	
	A value for PRUEF only is provided, if RW = blank or 0		
LAN	1	english language is used for output	
MET	blank or 0	metric units are used for input and desired for output	
	1	english units are used for input and desired for output	

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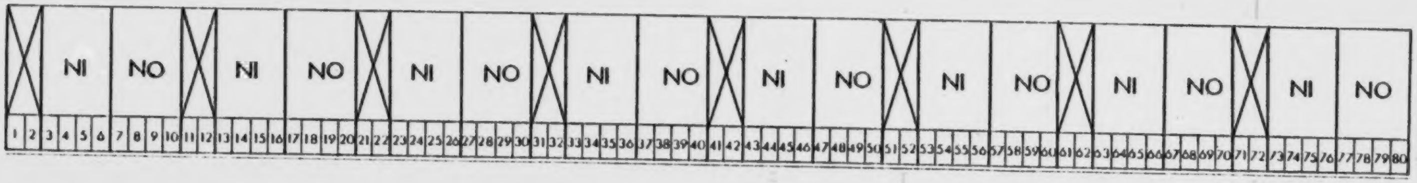
R
S

PROGRAM DTCHCK: Network data **DATA CARD(S) 3a:** Printout segments



EXPLANATIONS: NI, NO Inflow and outflow nodes of segments for which hydrograph printouts are desired.

NOTE: For single event simulations (C = 1 on DATA CARD 2 of PROGRAM DTCHCK: Network data) only.

Up to 100 segments may be specified in arbitrary sequence for a sewer network (RW = blank or 0 on DATA CARD 2 of PROGRAM DTCHCK: Network data). Up to 50 segments may be entered for a receiving water network (RW = 1 or 2 on DATA CARD 2 of PROGRAM DTCHCK: Network data).

In case of a continuous simulation (C = 3 on DATA CARD 2 of PROGRAM DTCHCK: Network data) 3a-type cards are ignored.

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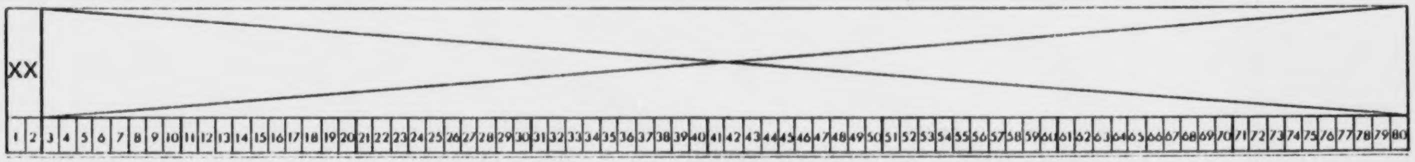
PROGRAM DTCHCK: Network data **DATA CARD 3b:** End of printout segements

R
S


XX
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card is mandatory and must contain XX in columns 1 and 2.

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S

PROGRAM DTCHCK: Network data

DATA CARD(S) 3c: Printout nodes, overflow structures

ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1 2 3 4	5 6 7 8	9 10 11 12	13 14 15 16	17 18 19 20	21 22 23 24	25 26 27 28	29 30 31 32	33 34 35 36	37 38 39 40	41 42 43 44	45 46 47 48	49 50 51 52	53 54 55 56	57 58 59 60	61 62 63 64	65 66 67 68	69 70 71 72	73 74 75 76	77 78 79 80

EXPLANATIONS:

ND — Names of overflow structures for which hydrograph printouts are desired, for single event simulations only (C = 1 on DATA CARD 2 of PROGRAM DTCHCK: Network data).

Up to 35 nodes (= maximum number of overflow structures in a sewer network) may be entered in arbitrary sequence.

NOTE: In case of a continuous simulation (C = 3 on DATA CARD 2 of PROGRAM DTCHCK: Network data) 3c-type cards are ignored. For a calculation of a receiving water network (RW = 1 or 2 on DATA CARD 2 of PROGRAM DTCHCK: Network data) omit these cards.

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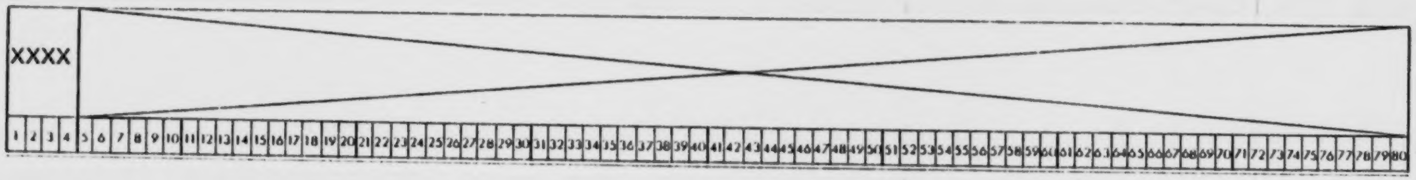
S

PROGRAM DTCHCK: Network data

DATA CARD 3d: End of printout nodes, overflow structures


XXXX
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card is mandatory in case of the calculation of a sewer network (RW = blank or 0 on DATA CARD 2 of PROGRAM DTCHCK: Network data) and must contain XXXX in columns 1 through 4.

NOTE: This card is omitted in case of a receiving water system simulation (RW = 1 or 2 on DATA CARD 2 of PROGRAM DTCHCK: Network data).

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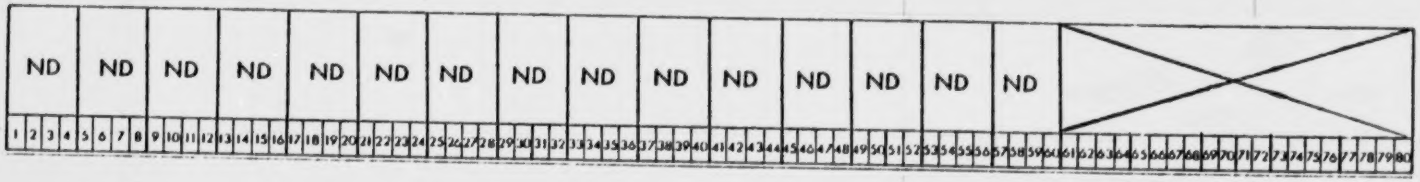
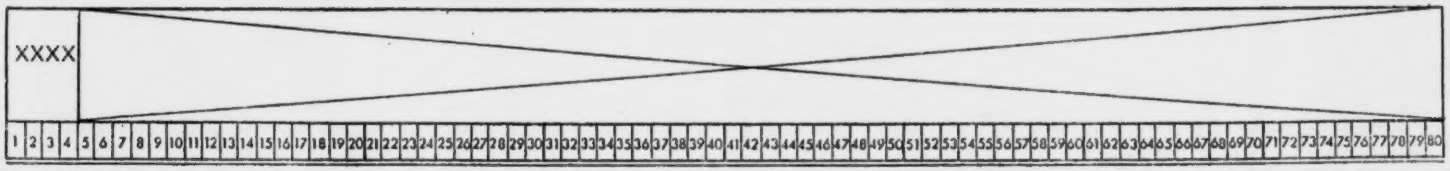
PROGRAM DTCHCK: Network data DATA CARD 3e: Printout nodes, basins


ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:	ND	Names of basins for which hydrograph printouts are desired for single event simulations (C = 1 on DATA CARD 2 of PROGRAM DTCHCK: Network data). Up to 15 nodes (= maximum number of detention structures in a sewer network) may be entered in arbitrary sequence.

NOTE: For continuous simulations (C = 3 on DATA CARD 2 of PROGRAM DTCHCK: Network data) 3e-type cards are ignored. For a calculation of a receiving water network (RW = 1 or 2 on DATA CARD 2 of PROGRAM DTCHCK: Network data) omit these cards.

PROGRAM DTCHCK: Network data DATA CARD 3f: End of printout nodes, basins S


XXXX
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card is mandatory, in case of the calculation of a sewer network (RW = blank or 0 on DATA CARD 2 of PROGRAM DTCHCK: Network data) and must contain XXXX in columns 1 through 4.

NOTE: This card is omitted in case of a receiving water system simulation (RW = 1 or 2 on DATA CARD 2 of PROGRAM DTCHCK: Network data).

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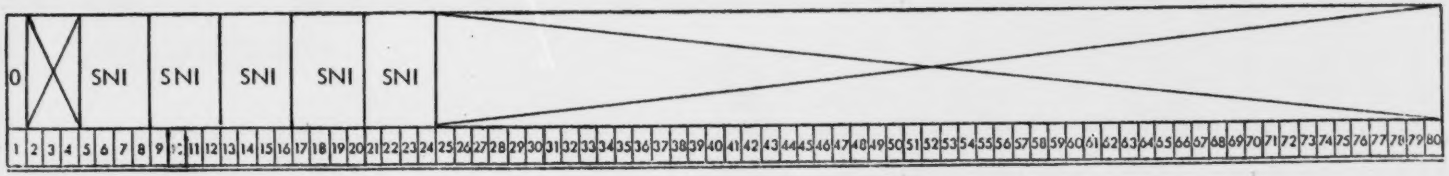
PROGRAM DTCHCK: Network data **DATA CARD 3g:** Special nodes of interest


0
SNI
SNI
SNI
SNI
SNI
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:	SNI	Special nodes of interest. At nodes with one inflow and one outflow, specified on this card, continuous simulation results may be statistically analyzed. Up to 5 node names may enter.

NOTE: In case of single event simulations the content of the 3g-card is ignored (C = 1 on DATA CARD 2 of PROGRAM DTCHCK: Network data).

TYPING GUIDE SHEET

PROGRAM DTCHCK: Network data DATA CARDS 3h: Nodes of interest

R
S

SN	☒	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1	2 3 4	5 6 7 8	9 10 11 12	13 14 15 16	17 18 19 20	21 22 23 24	25 26 27 28	29 30 31 32	33 34 35 36	37 38 39 40	41 42 43 44	45 46 47 48	49 50 51 52	53 54 55 56	57 58 59 60	61 62 63 64	65 66 67 68	69 70 71 72	73 74 75 76	77 78 79 80

EXPLANATIONS:

SN	Sequential number of 3h-type cards
ND	Nodes of interest. Special structures only may be defined as nodes of interest (see DATA CARD(S) 6 of PROGRAM DTCHCK: Network data). The names may enter in arbitrary sequence.

NOTE: 3 cards must be given with at least one and a maximum of 50 ND-entries for a sewer network simulation (RW = blank or 0 on DATA CARD 2 of PROGRAM DTCHCK: Network data) and a maximum of 30 ND-entries for a receiving water network (RW = 1 or 2).

In case of a continuous simulation the results at these nodes are statistically analyzed (C = 3 on DATA CARD 2 of PROGRAM DTCHCK: Network data).

In case of a single event simulation the contents of the 3h-type cards is ignored (C = 1 on DATA CARD 2 of PROGRAM DTCHCK: Network data).

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PROGRAM DTCHCK: Network data **DATA CARD 3i:** Boundary nodes (constant loading) R S

4	☒	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1	2 3 4 5 6 7 8	9 10 11 12	13 14 15 16	17 18 19 20	21 22 23 24	25 26 27 28	29 30 31 32	33 34 35 36	37 38 39 40	41 42 43 44	45 46 47 48	49 50 51 52	53 54 55 56	57 58 59 60	61 62 63 64	65 66 67 68	69 70 71 72	73 74 75 76	77 78 79 80

EXPLANATIONS: ND Boundary nodes with constant external loadings. A maximum number of 18 nodes may enter in arbitrary sequence.

NOTE: Special structures (DATA CARDS 6a, 6b, 6c, 7a and 7b of PROGRAM DTCHCK: Network data) and nodes having two outflows may not have external loadings. A boundary node must not be any node at the interface to a receiving water system.

This card must be contained with the 4 in column 1, even though the network does not have any nodes of this type.

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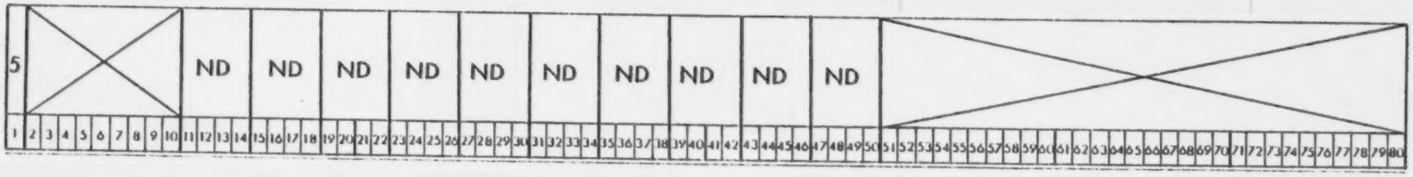
PROGRAM DTCHCK: Network data DATA CARD 3j: Boundary nodes (variable loading)

R
S


5
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:	ND	Boundary nodes with variable external loadings. A maximum number of 10 nodes may enter in arbitrary sequence.

NOTE: Special structures (DATA CARDS 6a, 6b, 6c, 7a and 7b of PROGRAM DTCHCK: Network data) and nodes having two outflows may not have external loadings. A boundary node must not be any node at the interface to a receiving water system.

This card must be contained with the 5 in column 1, even though the network does not have any nodes of this type.

In case of a continuous simulation the content of this card is ignored (C = 3 on DATA CARD 2 of PROGRAM DTCHCK: Network data).

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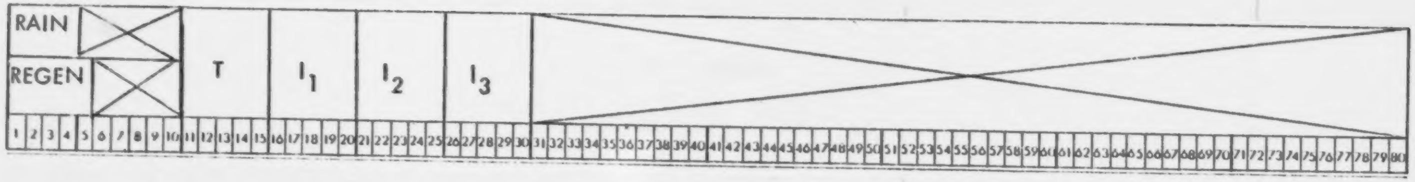
R


RAIN
REGEN
T
I_1
I_2
I_3
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:

T Time in minutes (integer values only), counting from the start of rainfall, e.g. 5 on the first card, 10 on the second, 15 on the third, etc.

I_1, I_2, I_3 Intensities in in/hr or $\frac{1}{1,000} \cdot \frac{\text{mm}}{\text{min}}$ (for 5 min. intervals), for precipitation series 1, 2 and 3 (see PS on DATA CARD 2 of PROGRAM DTCHCK: Network data).

NOTE: The first and the last card of this data group must contain the word "RAIN" in columns 1 through 4 for english units or "REGEN" in columns 1 through 5 for metric units.

Precipitation intensities on type-4 cards are allowed and necessary only for single event simulations (C = 1 on DATA CARD 2 of PROGRAM DTCHCK: Network data). For continuous simulations (C = 3) these cards must be removed.

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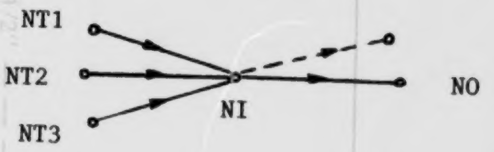
PROGRAM DTCHCK: Network data DATA CARD(S) 5a: Segment cards

1	NI	NO	NT1	NT2	NT3	CSC	H	W	L	YU	YD	SU	SD	N	☒	R
							.	.	.	.	.	.	.	.		

EXPLANATIONS:

NI	Name of inflow node
NO	Name of outflow node
NT1, NT2, NT3	Names of tributary nodes
CSC	Cross-section code (alphanumeric, but not XX. This code is used to assign the appropriate shape, specified on DATA CARD(S) 2a of PROGRAM DTCHCK: Quantity data, to the segment
H	Cross-section height in inches or meters
W	Cross-section width in inches or meters
L	Segment length in feet or meters
YU, YD	Upstream and downstream invert elevations in feet or meters, referenced to a base level, e.g. sea level
SU, SD	Upstream and downstream surface elevations, in feet or meters, referenced to a base level, e.g. sea level
N	Individual Manning's n, dimensionless (0.007 ≦ N ≦ 0.1). A value should be punched only, if it differs from the general N-value given on DATA CARD 2 of PROGRAM DTCHCK: Network data



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PROGRAM DTCHCK: Network data DATA CARD(S) 5a: Segement cards continued

EXPLANATIONS:

R Only in case of receiving water system simulation (RW = 1 or 2 on DATA CARD 2, PROGRAM DTCHCK: Network data)

1 if segment is part of receiving water 1
2 if segment is part of receiving water 2

NOTE:

The full flow capacity of any segment should be > $0.1\ m^3/s$.
The cross-section area of any segment should be > $0.001\ m^2$.
The length in m of any segment should be < full flow velocity in m/s * 300 s.

The maximum numbers of segment cards are 400 for a sewer network and 150 for a receiving water system.

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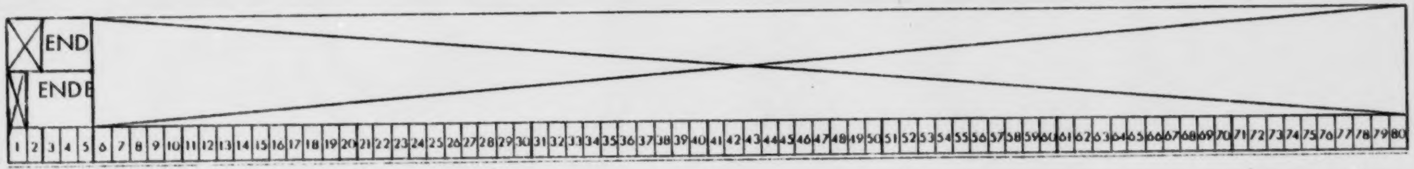
PROGRAM DTCHCK: Network data **DATA CARD 5b:** End card

R
S


END
ENDE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This final card for segments must contain END in columns 3 through 5 for english units or "ENDE" in columns 2 through 5 for metric units.

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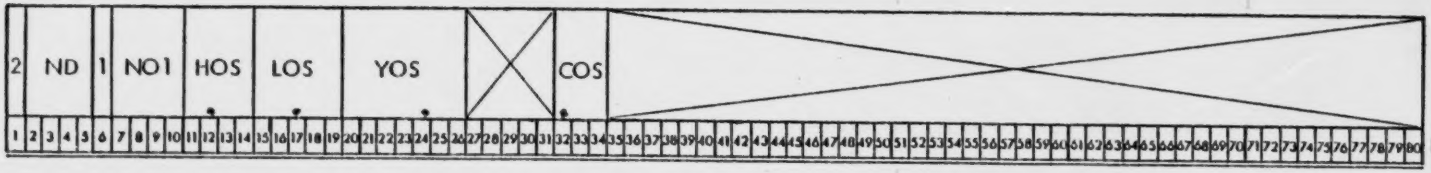
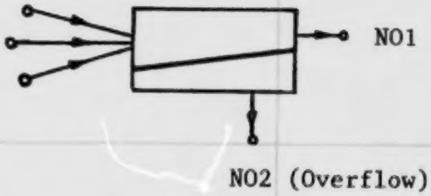
PROGRAM DTCHCK: Network data DATA CARD(S) 6a: Special structure type 1 S


2
ND
1
NO1
HOS
LOS
YOS
COS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: Special structure type 1 = Overflow structure (OS)


NO1
NO2 (Overflow)

ND	Nodal name of structure
NO1	Name of outflow node at outflow segment
HOS	Height of weir crest above structure invert elevation in feet or meters
LOS	Length of weir crest in feet or meters
YOS	Invert elevation of structure in feet or meters. This invert elevation must be above the lowest invert provided for sewer segments (see DATA CARD (S) 5a, PROGRAM DTCHCK: Network data)
COS	Overflow discharge coefficient in Poleni formula (dimensionless), default value = 0.65

$$Q = \frac{2}{3} . \sqrt{2g} . C . L . H^{1.5} = 2.95 . C . L . H^{1.5}$$

NOTE: The maximum number of overflow structures is 35. The input sequence of special structure type 1 cards is arbitrary.

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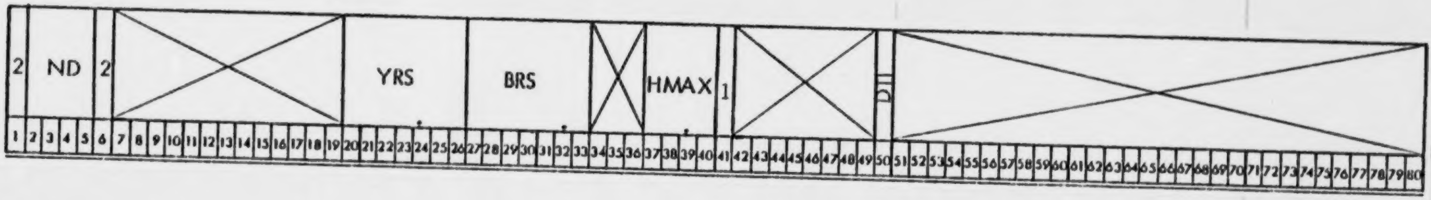
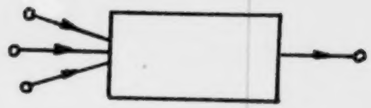

2
ND
2
YRS
BRS
HMAX
1
DTI
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: Special structure type 2 = Flooded detention basin (RS)



ND	Nodal name of structure
YRS	Invert elevation of structure in feet or meters
BRS	Bottom area size in square feet or square meters
HMAX	Height of structure in feet or meters, if there is a ceiling
DTI	Detention time index 0 no cleaning effect 1 detention basin with cleaning effect (see DATA CARDS 10a of PROGRAM DTCHCK: Quality data) 2 treatment basin (see DATA CARDS 10b, PROGRAM DTCHCK: Quality data)

NOTE: Under dry-weather flow the basin must be empty or the inflow must be equal to the outflow.

The input sequence of special structure type 2 cards is arbitrary.

For both, special structure types 2 and 3 (see DATA CARD(S) 6c, PROGRAM DTCHCK: Network data) a maximum of 15 structures may be entered.

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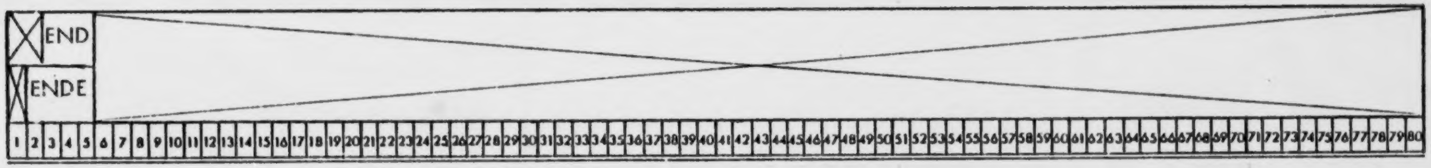
PROGRAM DTCHCK: Network data DATA CARD 6d: End card


END
ENDE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This final card for special structures must contain "END" in columns 3 through 5 for english units or "ENDE" in columns 2 through 5 for metric units.

NOTE: This card is mandatory, even though the network does not contain any special structures.

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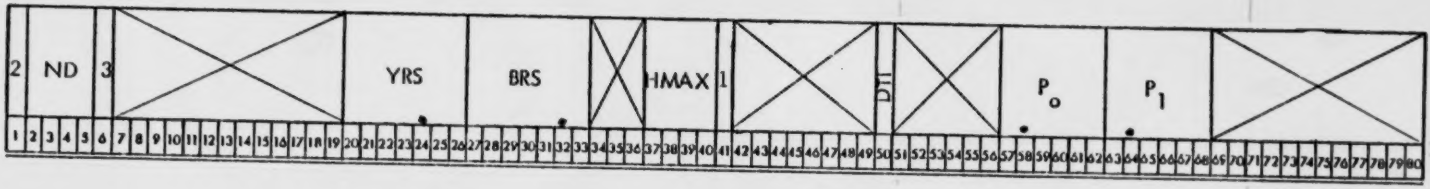
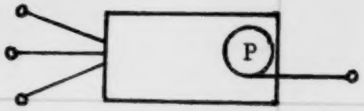
PROGRAM DTCHCK: Network data DATA CARD(S) 6c: Special structure type 3 S


2
ND
3
YRS
BRS
HMAX
1
DTI
P_o
P_1
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: Special structure type 3 = Pump drained detention basin (RS)

For ND, YRS, BRS, HMAX and DTI see type 2 structures (DATA CARD(S) 6b of PROGRAM DTCHCK: Network data)



P_o, P_1 Pumping line coefficient to be used in:

$$Q\ (H) = P_o + P_1 \cdot H$$

For derivation of the pumping line coefficients, Q must enter in m^3/s and H in m; maximum pump rate = P_o; maximum pumping height = $- P_o/P_1$ resulting in a negative number for P_1. Enter P_1 without the "-"sign.

NOTE: The pumping line should be defined in a way that the range of the real pumping curve, within which the pumps operates, is approximated by the line.

The input sequence of special structure type 3 cards is arbitrary.

For both special structure types 2 (see DATA CARD 6b, PROGRAM DTCHCK: Network data) and 3 a maximum of 15 structures may be entered.

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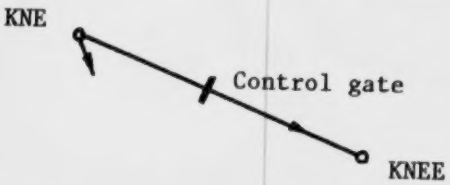
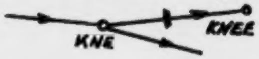
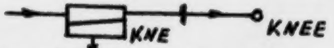
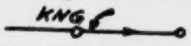
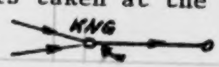
PROGRAM DTCHCK: Network data DATA CARD(S) 7a: Control gate type 1 S

1	KNG	HMAX	HMIN	TS	TO	KNE	KNEE	QVPR	
1	2 3 4 5	6 7 8 9 10	11 12 13 14 15	16 17 18 19	20 21 22 23	24 25 26 27	28 29 30 31	32 33 34 35 36	37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: CONTROL GATE TYPE 1: opening and closing linearily within a given time

KNG	Name of node, whose water surface elevation triggers opening and closing of gate
HMAX	Water surface elevation at KNG, at which the gate starts closing (HMAX > HMIN), in feet or meters
HMIN	Water surface elevation at KNG, at which the gate starts opening, in feet or meters
TS	Closing time in minutes
TO	Opening time in minutes
KNE	Upstream node of segment, in which the control gate is located
KNEE	Downstream node of segment, in which the control gate is located
QVPR	Flow through control gate in "closed" position in % of full flow capacity of the segment KNE-KNEE, e.g. 5.00



NOTE: The maximum number of control gates of type 1 and 2 together is 20. All water surface elevations on this card are above invert. A control gate must be located in a downstream segment of a branching point  or in the throttle of an overflow  .
The water surface elevation for triggering opening and closure is taken at the upper end of the downstream segment of KNG ( or ).

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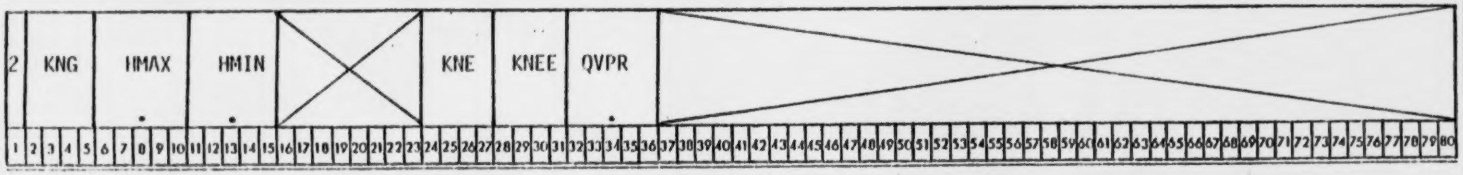
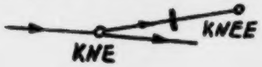
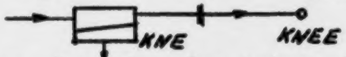
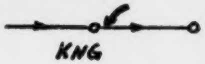
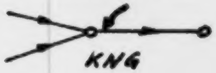
PROGRAM DTCHCK: Network data DATA CARD(S) 7b: Control gate type 2


2
KNG
HMAX
HMIN
KNE
KNEE
QVPR
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: CONTROL GATE TYPE 2: opening and closing directly dependent on water surface elevation at KNG

HMAX	Water surface elevation at KNG, beyond which the gate is closed, in feet or meters (and below which the gate opens) (HMAX > HMIN)
HMIN	Water surface elevation at KNG, up to which the gate is open, in feet or meters (and at which the gate starts closing)

For KNG, KNE, KNEE and QVPR see DATA CARD 7a of PROGRAM DTCHCK: Network data.

NOTE: The maximum number of control gates of type 1 and 2 together is 20. All water surface elevations on this card are above invert. A control gate must be located in a downstream segment of a branching point  or in the throttle of an overflow .
The water surface elevation for triggering opening and closure is taken at the upper end of the downstream segment of KNG ( or ).

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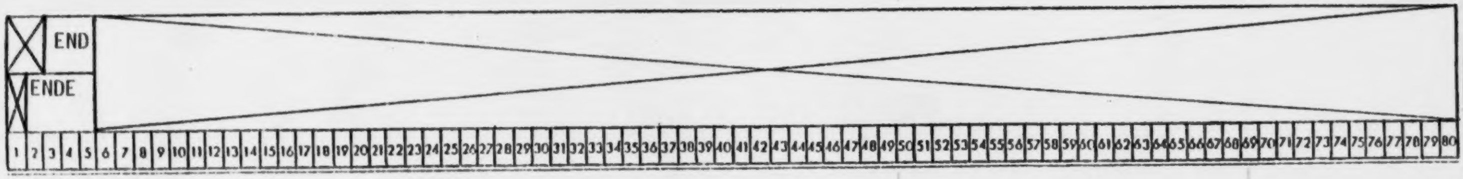
PROGRAM DTCHCK: Network data DATA CARD 7c: End card S


END
ENDE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card must contain "END" in columns 3 through 5 for english units or "ENDE" in columns 2 through 5 for metric units.

NOTE: This card must be contained even if there are no control gates.

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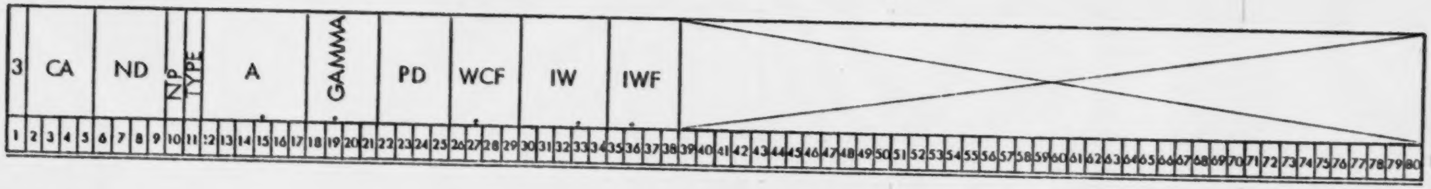
PROGRAM DTCHCK: Network data DATA CARD(S) 8a: Drainage areas

S


3
CA
ND
NP
TYPE
A
GAMMA
PD
WCF
IW
IWF
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:		
	CA	Name of drainage area
	ND	Name of node the drainage area belongs to. Up to three drainage areas may be connected to one node
	NP	Number of the precipitation series the area belongs to (1, 2 or 3)
	TYPE	Type number of area (1, 2, 3 or 4, see DATA CARD 4 of PROGRAM DTCHCK: Quantity data)
	A	Size of area in acres or hectares
	GAMMA	Ratio of impervious area to total area ($0.0 \leqq \text{GAMMA} \leqq 1.0$)
	PD	Population density in capita per acre or in capita per hectare
	WCF	Dimensionless water consumption factor for the drainage area; default value = value provided for WCF on DATA CARD 2 of PROGRAM DTCHCK: Network data
	IW	Industrial wastewater inflow from drainage area in cfs or l/s
	IWF	Dimensionless industrial water consumption factor; default value = value provided for IWF on DATA CARD 2 of PROGRAM DTCHCK: Network data

NOTE: Up to 100 drainage areas may be entered.

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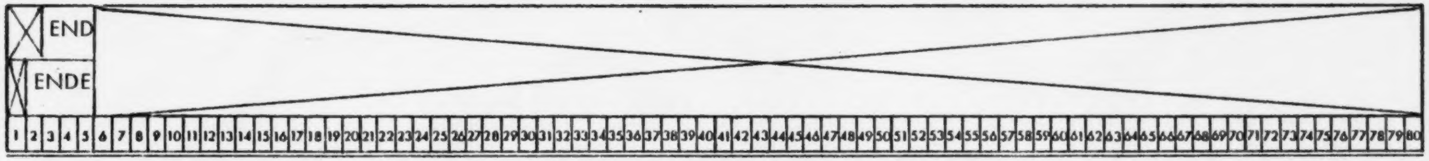
(4-76)

TYPING GUIDE SHEET

PROGRAM DTCHCK: Network data DATA CARD 8b: End card


END
ENDE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card must contain "END" in columns 3 through 5 for english units or "ENDE" in columns 2 through 5 for metric units.

This is the final card of the drainage area data and of the whole network data set.

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(4-76)

PROGRAM DTCHCK: Quantity data

DATA CARD	1 :	Title card
DATA CARD(S)	2a:	Cross-section cards
DATA CARD	2b:	Cross-section end card
DATA CARD	3 :	End card
DATA CARD	4 :	Area type designations
DATA CARD	5a:	Maximum initial losses
DATA CARD(S)	5b:	Initial losses at start of calculation
DATA CARD	6 :	Infiltration rates
DATA CARDS	7 :	Evaporation rates
DATA CARD	8a:	Title card of monthly temperatures
DATA CARD(S)	8b:	Minimum temperatures
DATA CARD(S)	8c:	Maximum temperatures
DATA CARDS	9 :	Unit hydrographs
DATA CARDS	10a:	Dry weather flow (diurnal pattern)
DATA CARDS	10b:	Industrial wastewater (diurnal pattern)
DATA CARD	11a:	Special nodes of interest
DATA CARD	11b:	End card of special nodes of interest
DATA CARD(S)	12a:	Constant external loadings
DATA CARD	12b:	End of constant external loadings
DATA CARDS	12c:	Variable external loadings (hydrographs)
DATA CARD	12d:	End of variable external loadings
DATA CARD	13a:	Receiving water title card
DATA CARDS	13b:	Receiving water flows
DATA CARD	13c:	End of receiving water flows

NOTE: R and S at the upper right of each data card description specifies if the data card(s) must be included for separate and combined sewer system (S) and/or for receiving water system (R) simulations.

If the format box on top of each data card description is subdivided, the upper part describes the input in english, the lower part in metric units.

A Fortran F-format (real numbers) is required, if a decimal point is shown in the space under consideration. The location of the decimal point as indicated is not binding and may be adjusted to fit the number into the space available. However, all real numbers must be provided including their decimal points. A Fortran I-format (integer numbers) is requested, if no decimal point is shown in the space under consideration. All integer numbers must be right adjusted within the space provided.

Symbols contained in the format box, but not individually explained, must be punched as shown.

Symbols used in the format boxes coordinate the explanations given on the data cards only and do not necessarily match the symbols used in the equations of Section 2 of Volume I (Model Description, Testing, and Applications).

PROGRAM DTCHCK: Quantity data **DATA CARD 1:** Title card

R
S

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80

EXPLANATIONS: Any text with up to 80 alphanumeric characters may be inserted.

NOTE: This card must be identical with the title cards of the precipitation, network and quality data.

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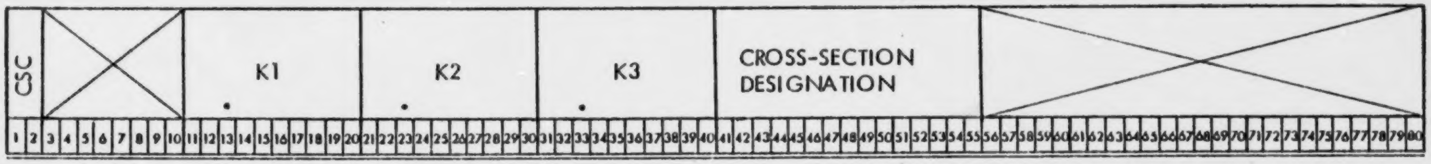
(4-76)

TYPING GUIDE SHEET

PROGRAM DTCHCK: Quantity data DATA CARD(S) 2a: Cross-section cards

R
S


CSC
K1
K2
K3
CROSS-SECTION DESIGNATION
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:		
	CSC	Cross-section code (alphanumeric). The code name may be arbitrarily chosen, however, XX may not be used.
	K1	A/H^2 = ratio of cross-sectional area to square of height
	K2	R/H = ratio of hydraulic radius to height
	K3	W/H = ratio of width to height
	CROSS-SECTION DESIGNATION	Any arbitrary name with up to 15 alphanumeric characters may be inserted, e.g. CIRCULAR

NOTE: The ratio R/H must be derived using metric units.

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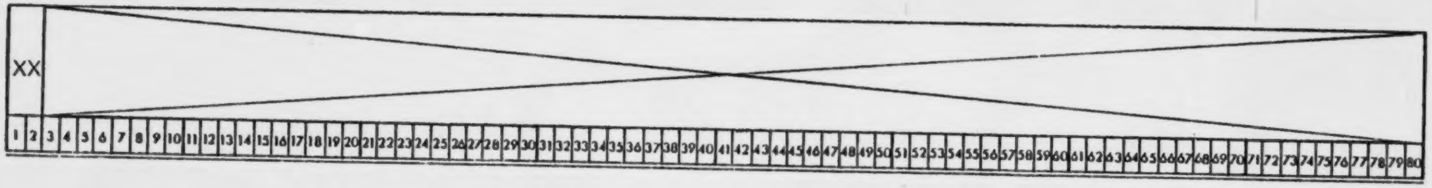
PROGRAM DTCHCK: Quantity data **DATA CARD 2b:** Cross-section end card


XX
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card marks the end of the cross-section card(s) and must contain XX in columns 1 and 2.

TYPING GUIDE SHEET

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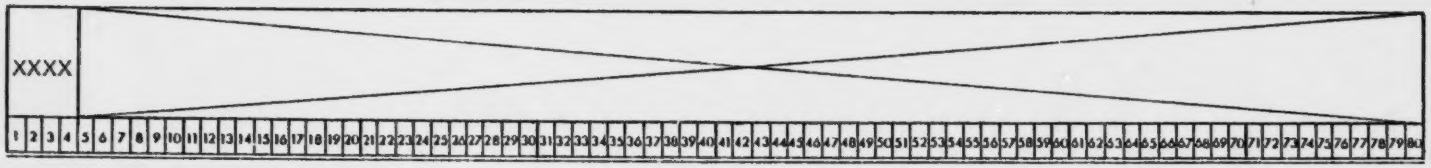
PROGRAM DTCHCK: Quantity data DATA CARD 3: End card


XXXX
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card is mandatory and must contain XXXX in columns 1 through 4.

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R
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PROGRAM DTCHCK: Quantity data   **DATA CARD 4:** Area type designations

<table>
<tr><td>1</td><td colspan="19">DESIGNATION</td><td>2</td><td colspan="19">DESIGNATION</td><td>3</td><td colspan="19">DESIGNATION</td><td>4</td><td colspan="19">DESIGNATION</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td><td>38</td><td>39</td><td>40</td><td>41</td><td>42</td><td>43</td><td>44</td><td>45</td><td>46</td><td>47</td><td>48</td><td>49</td><td>50</td><td>51</td><td>52</td><td>53</td><td>54</td><td>55</td><td>56</td><td>57</td><td>58</td><td>59</td><td>60</td><td>61</td><td>62</td><td>63</td><td>64</td><td>65</td><td>66</td><td>67</td><td>68</td><td>69</td><td>70</td><td>71</td><td>72</td><td>73</td><td>74</td><td>75</td><td>76</td><td>77</td><td>78</td><td>79</td><td>80</td></tr>
</table>

EXPLANATIONS:	DESIGNATION	Area type specifiation, e.g. RESIDENTIAL, COMMERCIAL, INDUSTRIAL, PARKS, etc.

NOTE: If there are less than four different area types, the unused fields must remain empty.

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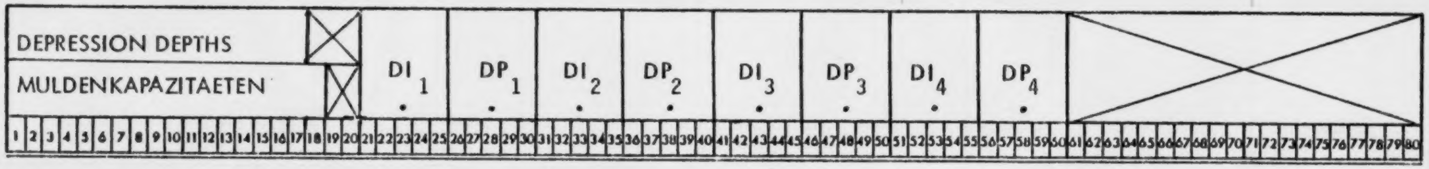
TYPING GUIDE SHEET

PROGRAM DTCHCK: Quantity data DATA CARD 5a: Maximum initial losses

R
S


DEPRESSION DEPTHS
MULDENKAPAZITAETEN
DI 1
DP 1
DI 2
DP 2
DI 3
DP 3
DI 4
DP 4
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card must contain "DEPRESSION DEPTHS" in columns 1 through 17 for english units or "MULDENKAPAZITAETEN" in columns 1 through 18 for metric units.

DI_j Initial losses in inches or mm of rainfall on impervious areas for area types 1 through 4 (see DATA CARD 4 of PROGRAM DTCHCK: Quantity data)

DP_j Initial losses in inches or mm of rainfall on pervious areas for area types 1 through 4 (see DATA CARD 4 of PROGRAM DTCHCK: Quantity data)

NOTE: The initial losses include initial evaporation, wetting losses, depression capacities on the oversurfaces and initial losses within the drainage system of the catchments. For pervious areas in addition the initial rate of infiltration capacity above the final constant rate is included in the initial losses.

Dependent on surface roughness and land use the initial losses for impervious areas vary from 0.5 to 3.0 mm. The part of infiltration additionally included for pervious areas may amount up to 12.0 mm. The following tables contain some reference values:

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PROGRAM DTCHCK: Quantity data DATA CARD 5a: Maximum initial losses continued

REFERENCE VALUES FOR INITIAL OR STARTING LOSSES ON IMPERVIOUS AREAS

Land Use	Initial or Starting Loss (mm)
Commercial	0.5 to 2.0
Residential	0.7 to 2.5
Industrial	1.0 to 3.0

EXAMPLES OF REFERENCE VALUES FOR INITIAL OR STARTING LOSSES FOR PERVIOUS SURFACES

Land use Soil surface characteristics (Typical examples)	Initial or starting loss (mm)
Open space	10
Cultivated soil (corn, root crops, viniculture, hop culture, etc.)	8
Landscaped strip, playground	2
Protected green areas and slopes	5
Garden or meadow	5

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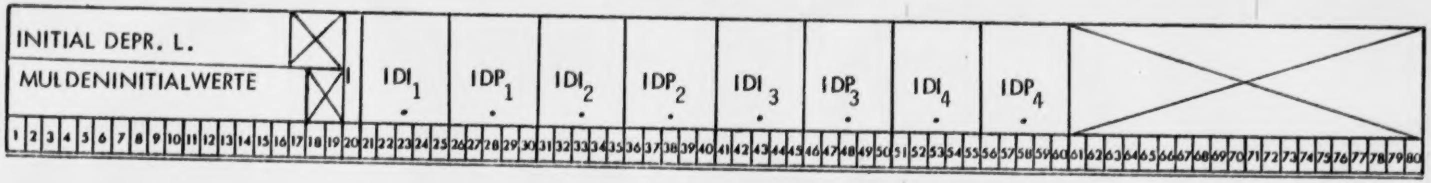
TYPING GUIDE SHEET

PROGRAM DTCHCK: Quantity data   DATA CARD(S) 5b: Initial losses at start of calculation

R
S


INITIAL DEPR. L.
MULDENINITIALWERTE
I
IDI$_1$
IDP$_1$
IDI$_2$
IDP$_2$
IDI$_3$
IDP$_3$
IDI$_4$
IDP$_4$
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card must contain "INITIAL DEPR. L." in columns 1 through 17 for english units or "MULDENINITIALWERTE" in columns 1 through 18 for metric units.

I	Number of precipitation series
IDI$_j$	Initial depression losses, in inches or mm on impervious areas for area type j (see DATA CARD 4 of PROGRAM DTCHCK: Quantity data)
IDP$_j$	Initial depression losses, in inches or mm on pervious areas for area type j (see DATA CARD 4 of PROGRAM DTCHCK: Quantity data)

NOTE: For each precipitation series one card must be furnished.

The initial losses at the start of a calculation must be smaller than the maximum initial losses provided on DATA CARD 5a of PROGRAM DTCHCK: Quantity data. The values must be valid for 00:00 hours at the day of rainfall accounting for the evaporation (see DATA CARD 7 of PROGRAM DTCHCK: Quantity data) from 00:00 hours to the start of rainfall.

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PROGRAM DTCHCK: Quantity data **DATA CARD 6:** Infiltration rates R
S

INFILTRATION RATES VERSICKERUNGSRATEN	X	INF_{11} .	INF_{12} .	INF_{13} .	INF_{14} .	INF_{21} .	INF_{22} .	INF_{23} .	INF_{24} .	INF_{31} .	INF_{32} .	INF_{33} .	INF_{34} .
1–18	19–20	21–25	26–30	31–35	36–40	41–45	46–50	51–55	56–60	61–65	66–70	71–75	76–80

EXPLANATIONS: This card must contain "INFILTRATION RATES" in columns 1 through 18 for english units or "VERSICKERUNGSRATEN" in columns 1 through 18 for metric units.

INF_{ij} Infiltration rates in in./hr. or l/s/ha for precipitation series i and area type j

NOTE: The infiltration rates requested here are the final constant rates of infiltration capacity. The initial rate of infiltration capacity is included in the maximum initial loss given on DATA CARD 5a of PROGRAM DTCHCK: Quantity data. The values for the final constant rates of infiltration may vary substantially and are mainly dependent on the perviousness of the top soil layer. Some examples of reference values for soil infiltration losses (infiltration rates) are given in the following table:

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EXAMPLES OF REFERENCE VALUES FOR SOIL INFILTRATION LOSSES FOR PERVIOUS AREAS

Land use Soil surface characteristics (Typical examples)	Soil infiltration (l/s ha) Clay	 Clayey sand	 Sand, loess, gravel
Open space	20	30	40
Cultivated soil (corn, root crops, viniculture, hop culture, etc.)	10	20	30
Landscaped strip, playground	5	10	10
Protected green areas and slopes	20	30	50
Garden or meadow	20	30	40

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PROGRAM DTCHCK: Quantity data DATA CARDS 7: Evaporation rates

EVAPORATION RATES VERDUNSTUNGSRATEN		EVA .	EVA .	EVA .	EVA .	EVA .	EVA .	EVA .	EVA .	EVA .	EVA .
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	18 19 20 21 22 23 24 25 26 27 28 29 30	31 32 33 34 35	36 37 38 39 40	41 42 43 44 45	46 47 48 49 50	51 52 53 54 55	56 57 58 59 60	61 62 63 64 65	66 67 68 69 70	71 72 73 74 75	76 77 78 79 80

EXPLANATIONS: EVA Evaporation rates in in /day or mm/day, as dependent on temperature. The sequence is increasing in steps of 2 °F, starting with 34 °F or in steps of 1 °C, starting with 1 °C. Therefore

the 1st card will contain the evaporation rates for the temperatures from 34 to 52 °F or 1 to 10 °C,
the 2nd card will contain the evaporation rates for the temperatures from 54 to 72 °F or 10 to 20 °C,
the 3rd card will contain the evaporation rates for the temperatures from 74 to 92 °F or 20 to 30 °C,
the 4th card will contain the evaporation rates for the temperatures from 94 to 112 °F or 30 to 40 °C,
the 5th card will contain the evaporation rates for the temperatures from 114 to 132 °F or 40 to 50 °C.

NOTE: Five cards are necessary, the first of which must contain "EVAPORATION RATES" in columns 1 through 17 for english units or "VERDUNSTUNGSRATEN" in columns 1 through 17 for metric units.

The evaporation rates usually vary from 0.0 to 23.0 mm/day, but should be taken from local records.

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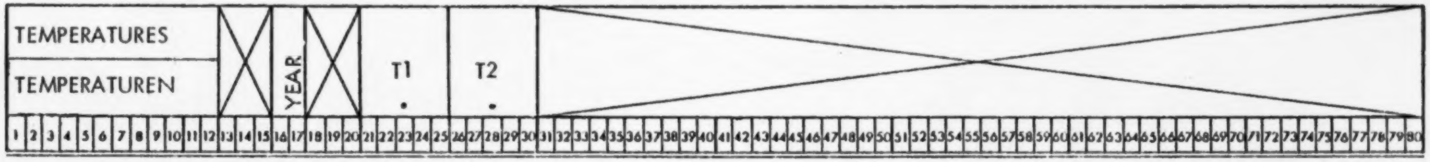
EPA-287 (Cin.)
(4-76)

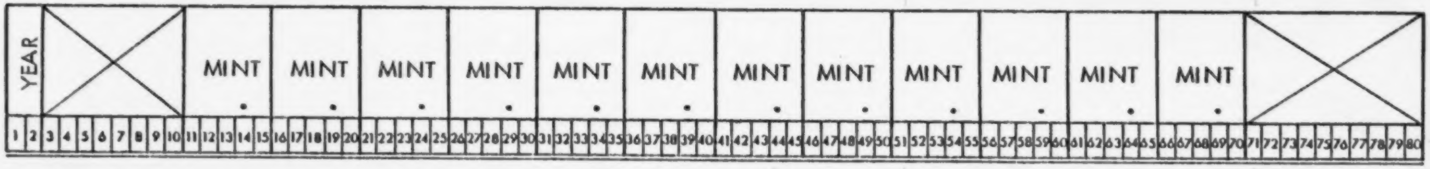
PROGRAM DTCHCK: Quantity data **DATA CARD 8a: Title card of monthly temperatures**


TEMPERATURES
TEMPERATUREN
YEAR
T1
T2
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card must contain "TEMPERATURES" in columns 1 through 12 for english units or "TEMPERATUREN" in columns 1 through 12 for metric units.

YEAR	Number of years for which temperature cards follow (≦ 20)
T1	Time of day at which minimum temperatures occur on an average, e.g. 3.40 (hr.min)
T2	Time of day at which maximum temperatures occur on an average, e.g. 14.00 (hr.min)

PROGRAM DTCHCK: Quantity data DATA CARD(S) 8b: Minimum temperatures


YEAR
MINT
MINT
MINT
MINT
MINT
MINT
MINT
MINT
MINT
MINT
MINT
MINT
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:

YEAR	Calendar year minus 1900, e.g. 75
MINT	Average monthly minimum temperatures from January through December in °F or °C (MINT ≧ 32.1 °F or MINT ≧ 0.1 °C)

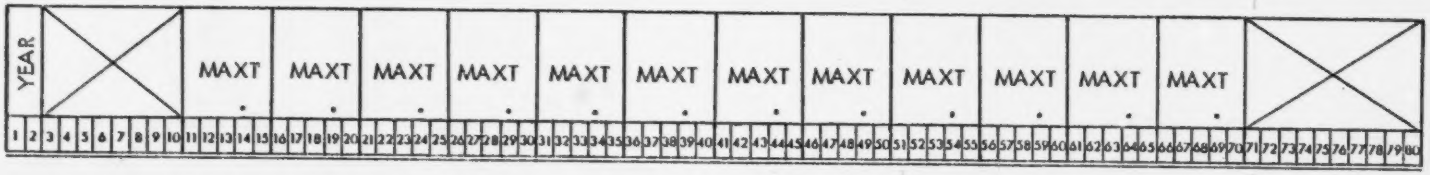
NOTE: This card must be submitted for each year simulated; the sequence is arbitrary.

The average monthly minimum temperatures should be derived from local records.

TYPING GUIDE SHEET

PROGRAM DTCHCK: Quantity data DATA CARD(S) 8c: Maximum temperatures

R
S


YEAR
MAXT
MAXT
MAXT
MAXT
MAXT
MAXT
MAXT
MAXT
MAXT
MAXT
MAXT
MAXT
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:

YEAR	Calendar year minus 1900, e.g. 75
MAXT	Average monthly maximum temperatures from january through december in °F or °C (MAXT ≧ MINT + .2 °F or MAXT ≧ MINT + .1 °C)

NOTE: This card must be submitted for each year simulated, the sequence is arbitrary.

The average monthly maximum temperatures should be derived from local records.

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(4-76)

TYPING GUIDE SHEET

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PROGRAM DTCHCK: Quantity data DATA CARDS 9: Unit hydrographs

UNIT HYDROGRAPHS EINHEITS GANGLINIEN	☒	T	QI_1	QP_1	QI_2	QP_2	QI_3	QP_3	QI_4	QP_4
		.	.	.	.	.	.	.	.	.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	17 18	19 20 21 22 23 24	25 26 27 28 29 30 31	32 33 34 35 36 37 38	39 40 41 42 43 44 45	46 47 48 49 50 51 52	53 54 55 56 57 58 59	60 61 62 63 64 65 66	67 68 69 70 71 72 73	74 75 76 77 78 79 80

EXPLANATIONS:

T	Time in minutes, e.g. 5.0, 10.0, 15.0, etc.
QI_j	Dimensionless ordinates of unit hydrographs at time T for impervious areas for area type j (see DATA CARD 4 of PROGRAM DTCHCK: Quantity data)
QP_j	Dimensionless ordinates of unit hydrographs at time T for pervious areas for area type j (see DATA CARD 4 of PROGRAM DTCHCK: Quantity data)

NOTE: Up to 30 cards may be submitted (max. T = 150.0 minutes). The sum of all ordinates of one unit hydrograph must be 1.0.

The first and the last card must contain the words "UNIT HYDROGRAPHS" in columns 1 through 16 for english units or "EINHEITSGANGLINIEN" in columns 1 through 18 for metric units, the center cards do not.

The unit hydrographs may be derived from rainfall-runoff measurements or synthetic unit hydrographs may be used. The values as contained in Appendix 7, Test Example for PROGRAM DTCHCK are not generally transferable on other areas, as the shape of the unit hydrographs is dependent on catchment size, shape, slope, land use and other characteristics.

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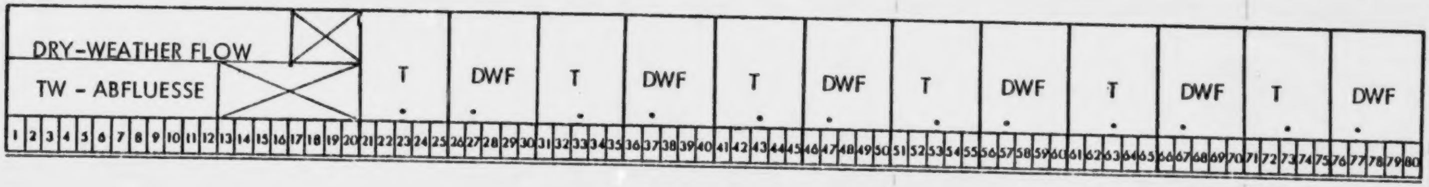
(4-76)

PROGRAM DTCHCK: Quantity data DATA CARDS 10a: Dry-weather flow (diurnal pattern) R S


DRY-WEATHER FLOW
TW - ABFLUESSE
T
DWF
T
DWF
T
DWF
T
DWF
T
DWF
T
DWF
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:

T — Time in hr.min, e.g. 12.00
The values for T on the first card must be:
0.00 4.00 8.00 12.00 16.00 20.00
With each subsequent card these values are increased by half an hour, e.g.:
0.30 4.30 8.30 12.30 16.30 20.30

DWF — Dry-weather flow in cfs per 1,000 inhabitants or l/s per 1,000 inhabitants

NOTE: Eight cards are required, the first of which should contain the words "DRY-WEATHER FLOW" in columns 1 through 16 for english units or "TW-ABFLUESSE" in columns 1 through 12 for metric units.

The dry-weather flow values may be assumed to be similar to the water consumption in the area under consideration. Frequently constant dry-weather flow values may suffice.

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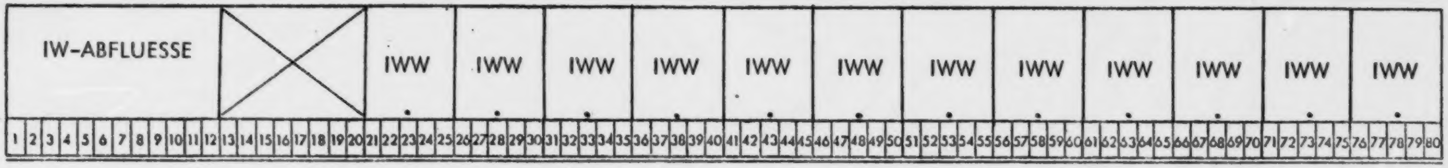
(4-76)

PROGRAM DTCHCK: Quantity data **DATA CARDS 10b:** Industrial wastewater (diurnal pattern) **S**


IW-ABFLUESSE
IWW
IWW
IWW
IWW
IWW
IWW
IWW
IWW
IWW
IWW
IWW
IWW
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:	IWW	Relative values for the industrial waste water provided in half-hour timesteps (dimensionless).

NOTE: Four cards are necessary, the first of which should contain the word "IW-ABFLUESSE" in columns 1 through 12 for english and metric units.

The average of all 48 values must be 1.0.

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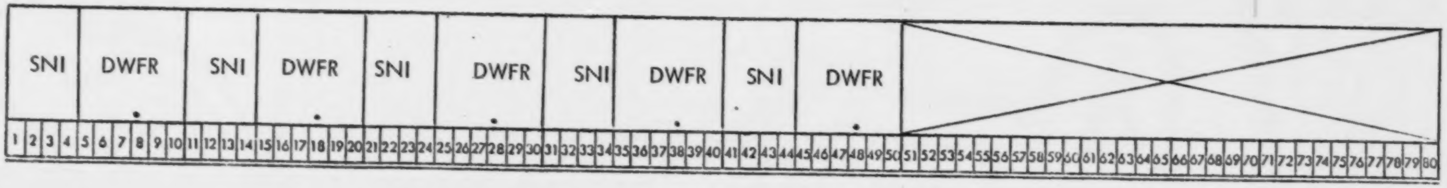
(4-76)

PROGRAM DTCHCK: Quantity data DATA CARDS 11a: Special nodes of interest S


SNI
DWFR
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DWFR
SNI
DWFR
SNI
DWFR
SNI
DWFR
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:

SNI	Special nodes of interest (compare DATA CARD 3g of PROGRAM DTCHCK: Network data)
DWFR	Relative value (dimensionless) of dry-weather flow above which the runoff values of continuous simulations enter statistical analysis, e. g. 1.20 (for properties concerned see Appendix 5, Properties for Statistical Analysis).

NOTE: This card is only allowed in case of continuous sewer system calculations (C = 3 and RW = blank or 0 on DATA CARD 2 of PROGRAM DTCHCK: Network data).

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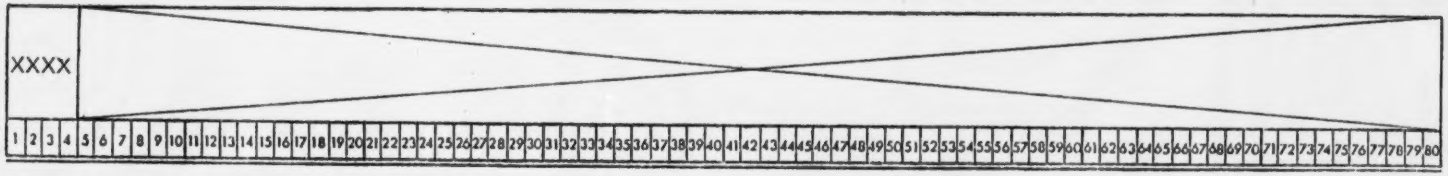
PROGRAM DTCHCK: Quantity data **DATA CARD 11b:** End card of special nodes of interest


XXXX
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card is mandatory. The card marks the end of the special nodes of interest and must contain XXXX in columns 1 through 4.

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PROGRAM DTCHCK: Quantity data DATA CARD(S) 12a: Constant external loadings

ND	QEX .	ND	QEX .	ND	QEX .	ND	QEX .	ND	QEX .	ND	QEX .	ND	QEX .	ND	QEX .
1 2 3 4	5 6 7 8 9 10	11 12 13 14	15 16 17 18 19 20	21 22 23 24	25 26 27 28 29 30	31 32 33 34	35 36 37 38 39 40	41 42 43 44	45 46 47 48 49 50	51 52 53 54	55 56 57 58 59 60	61 62 63 64	65 66 67 68 69 70	71 72 73 74	75 76 77 78 79 80

EXPLANATIONS:

ND	Name of boundary node with constant external loading
QEX	External loading in cfs or l/s

NOTE: Any number of cards may be read in, but only loadings at nodes, specified on DATA CARD 3i of PROGRAM DTCHCK: Network data, are considered.

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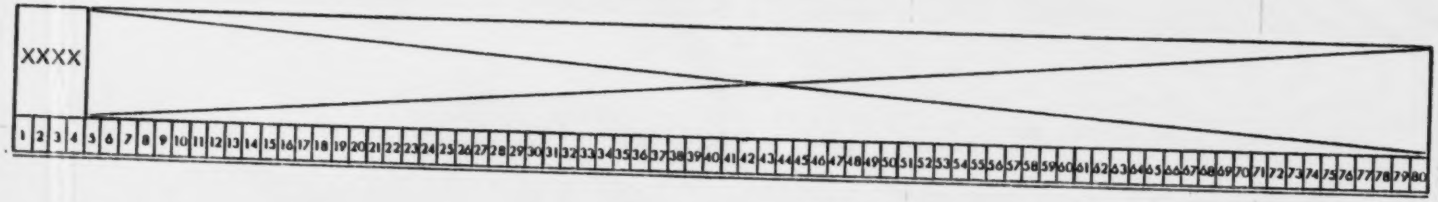
TYPING GUIDE SHEET

PROGRAM DTCHCK: Quantity data **DATA CARD 12b:** End of constant external loadings

R
S


XXXX
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card is mandatory and must contain XXXX in columns 1 through 4

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PROGRAM DTCHCK: Quantity data DATA CARDS 12c: Variable external loadings (hydrographs)

R
S

ND	☒	T_o	QEX_o	T_1	QEX_1	T_2	QEX_2	T_3	QEX_3	T_4	QEX_4	T_5	QEX_5	T_j	QEX_i
1 2 3 4	5 6 7 8 9 10	11 12 13 14	15 16 17 18 . 19 20	21 22 23 24	25 26 27 28 . 29 30	31 32 33 34	35 36 37 38 . 39 40	41 42 43 44	45 46 47 48 . 49 50	51 52 53 54	55 56 57 58 . 59 60	61 62 63 64	65 66 67 68 . 69 70	71 72 73 74	75 76 77 78 . 79 80

EXPLANATIONS:

ND	Name of boundary node with variable external loading (hydrograph)
T_j	Time in minutes; the values must increase in 5-minute steps, the first value (T_o) must be zero, e.g. 0, 5, 10, etc.
QEX_i	External loading in cfs or l/s at time T_j

NOTE: The end of hydrograph is marked by a negative time value (e.g. -1). One hydrograph may contain up to 289 time values (T_o plus 288 intervals).

Any number of hydrographs may be read in but only the hydrographs at nodes specified on DATA CARD 3j of PROGRAM DTCHCK: Network data are considered for single event simulations.

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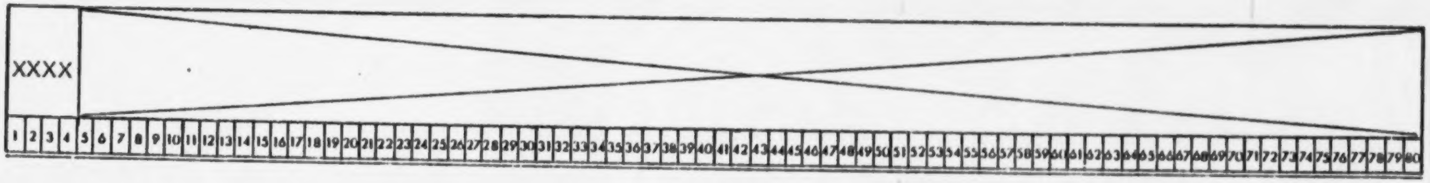
PROGRAM DTCHCK: Quantity data DATA CARD 12d: End of variable external loadings

R
S


XXXX
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card is mandatory and must contain XXXX in columns 1 through 4.

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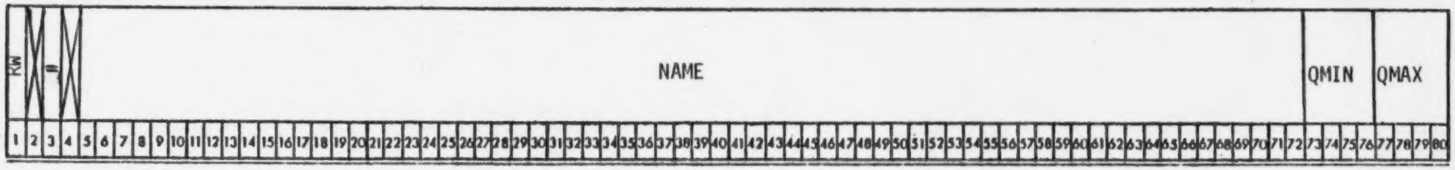
PROGRAM DTCHCK: Quantity data DATA CARD 13a: Receiving water title card R


RW
=
NAME
QMIN
QMAX
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

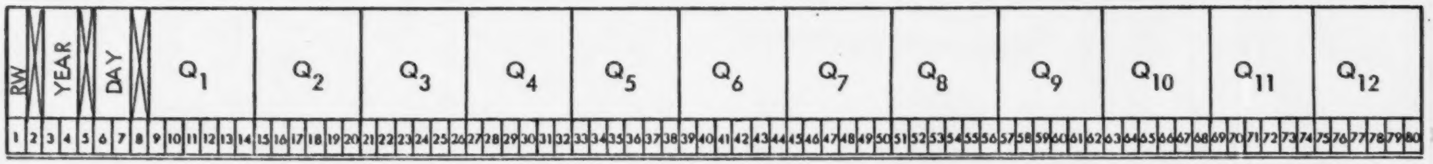
EXPLANATIONS:	RW	Number of receiving water (1 or 2)
	NAME	Any name of receiving water with up to 68 alphanumeric characters may be inserted
	QMIN	Lower flow limit in cfs or m^3/s
	QMAX	Upper flow limit in cfs or m^3/s

NOTE: Flow values exceeding the limits QMIN or QMAX cause an informative message only by the PROGRAM DTCHCK.

TYPING GUIDE SHEET

R

PROGRAM DTCHCK: Quantity data DATA CARDS 13b: Receiving water flows


RW
YEAR
DAY
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:

RW	Number of receiving water according to DATA CARD 12a of PROGRAM DTCHCK: Quantity data
YEAR	Calendar year minus 1900, e.g. 75
DAY	Number of day from 1 to 31
Q_j	Daily receiving water flow for the months January through December in cfs or m^3/s

NOTE: 31 cards are required for one year.

Up to 20 years may be read in, which is a maximum of 20 times 31 cards.

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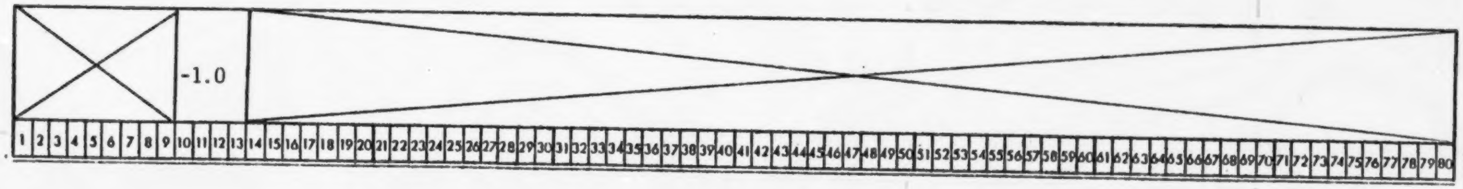
PROGRAM DTCHCK: Quantity data DATA CARD 13c: End of receiving water flows R S


-1.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: The end of the discharge figures of a receiving water is marked by this card, containing -1.0 in columns 10 through 13.

NOTE: Subsequently follows DATA CARD 13a for the second receiving water, if available as well as the sequence of cards specified on DATA CARD 13b. Again the end is marked by a DATA CARD 13c.

This is the last card of the Quantity data set.

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PROGRAM DTCHCK: Quality data

DATA CARD	1 :	Title card
DATA CARD	2 :	Names of pollutants
DATA CARD	3a:	Maximum pollution
DATA CARD	3b:	Initial pollution
DATA CARD	3c:	Pollutant build-up times
DATA CARDS	3d:	Build-up function coefficients
DATA CARD	4 :	Street cleaning
DATA CARDS	5 :	Unit pollutant load hydrographs
DATA CARD	6 :	Area factors
DATA CARDS	7 :	Influence of rainfall duration
DATA CARDS	8 :	Diurnal variation influence
DATA CARD(S)	9 :	Seasonal variation influence
DATA CARDS	10a:	Cleaning effect of detention facilities within the sewer network
DATA CARDS	10b:	Cleaning effect of storm or combined sewage treatment basins
DATA CARDS	11a:	Dry-weather flow pollution (diurnal pattern)
DATA CARD	11b:	Industrial wastewater pollution
DATA CARD(S)	11c:	Special industrial wastewater pollution
DATA CARD	11d:	Dry-weather flow pollution end card
DATA CARD(S)	12a:	Constant external loading pollution
DATA CARD	12b:	End of constant external loading pollution
DATA CARDS	12c:	Variable external loading pollution (pollutograph)
DATA CARD	12d:	End of variable external loading pollution
DATA CARD	13a:	Receiving water title card
DATA CARDS	13b:	Receiving water pollution
DATA CARD	13c:	End of receiving water pollution

NOTE: R and S at the upper right of each data card description specifies if the data card(s) must be included for separate and combined sewer system (S) and/or for receiving water system (R) simulations.

If the format box on top of each data card description is subdivided, the upper part describes the input in english, the lower part in metric units.

A Fortran F-format (real numbers) is required, if a decimal point is shown in the space under consideration. The location of the decimal point as indicated is not binding and may be adjusted to fit the number into the space available. However, all real numbers must be provided including their decimal points. A Fortran I-format (integer numbers) is requested, if no decimal point is shown in the space under consideration. All integer numbers must be right adjusted within the space provided.

Symbols contained in the format box, but not individually explained, must be punched as shown.

Symbols used in the format boxes coordinate the explanations given on the data cards only and do not necessarily match the symbols used in the equations of Section 2 of Volume I (Model Description, Testing, and Applications).

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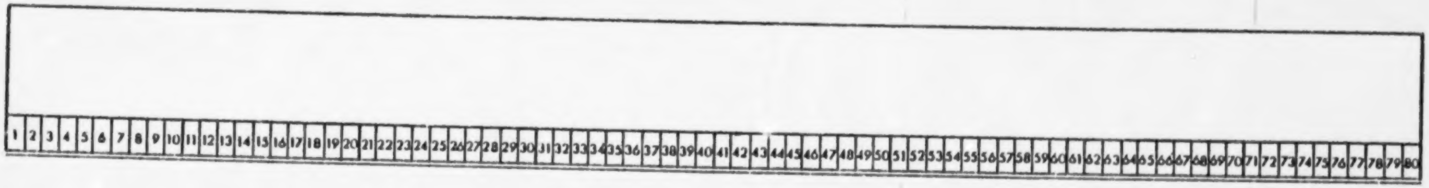
PROGRAM DTCHCK: Quality data **DATA CARD 1:** Title card


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: Any text with up to 80 alphanumeric characters may be inserted.

NOTE: This card must be identical with the title cards of the precipitation, network and quantity data.

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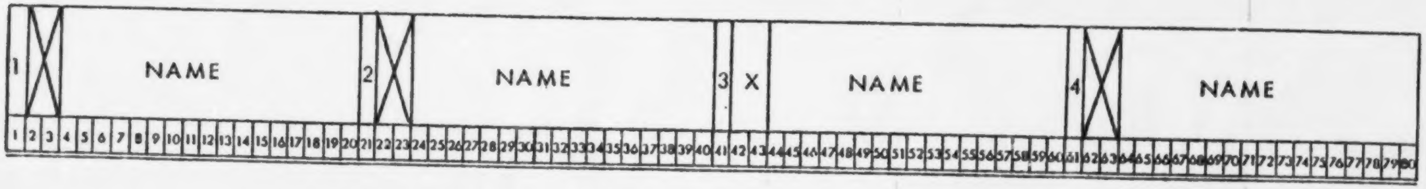
PROGRAM DTCHCK: Quality data DATA CARD 2: Names of pollutants


1
NAME
2
NAME
3
X
NAME
4
NAME
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:

X	Exponent of the multiplication factor 10^X by which the input figures of pollutant 3 are multiplied to account for bacteria counts per acre or per ha, e.g. X = 10 should be entered for fecal coliforms.
NAME	Name of pollutant

NOTE: The third pollutant is reserved for fecal coliforms. If there are less than four pollutants simulated the remaining columns remain empty.

In case of bacteria counts per liter on DATA CARDS 11a, 11b, 11c, 12a and 13b of PROGRAM DTCHCK: Quality data the multiplication factor is 10^Y where Y = X - 3.

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TYPING GUIDE SHEET

R
S

PROGRAM DTCHCK: Quality data DATA CARD 3a: Maximum pollution

PM_{11}	PM_{12}	PM_{13}	PM_{14}	PM_{21}	PM_{22}	PM_{23}	PM_{24}	PM_{31}	PM_{32}	PM_{33}	PM_{34}	PM_{41}	PM_{42}	PM_{43}	PM_{44}
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1 2 3 4 5	6 7 8 9 10	11 12 13 14 15	16 17 18 19 20	21 22 23 24 25	26 27 28 29 30	31 32 33 34 35	36 37 38 39 40	41 42 43 44 45	46 47 48 49 50	51 52 53 54 55	56 57 58 59 60	61 62 63 64 65	66 67 68 69 70	71 72 73 74 75	76 77 78 79 80

EXPLANATIONS: PM_{ij} Maximum amount of pollution for pollutant i in lbs./acre or kg/ha, or number of bacteria x 10^X/acre or number of bacteria x 10^X/ha in an area of type j (X and pollutant i are specified on DATA CARD 2 of PROGRAM DTCHCK: Quality data, the area of type j is defined on DATA CARD 4 of PROGRAM DTCHCK: Quantity data).

NOTE: The maximum pollution is the amount of pollution which may accumulate in a catchment (including in the lateral sewers) after a dry spell of indefinite duration. Some reference values are given in the following table:

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REFERENCE VALUES FOR MAXIMUM POLLUTION BUILD-UP

Pollution parameter	$P_{up,100}$
BOD_5	15 to 40 kg/ha
$KMnO_4$	100 to 200 kg/ha
COD	100 to 200 kg/ha
Settleable solids	60 to 125 kg/ha
TSS	60 to 125 kg/ha
Lead	up to approx. 0.03 kg/ha
Total phosphorus	up to approx. 0.2 kg/ha
Fecal coliforms	500×10^{10} to $5{,}000 \times 10^{10}$/ha

PROGRAM DTCHCK: Quality data DATA CARD 3b: Initial pollution

R
S

PI_{11}	PI_{12}	PI_{13}	PI_{14}	PI_{21}	PI_{22}	PI_{23}	PI_{24}	PI_{31}	PI_{32}	PI_{33}	PI_{34}	PI_{41}	PI_{42}	PI_{43}	PI_{44}
1 2 3 4 . 5	6 7 8 9 . 10	11 12 13 14 . 15	16 17 18 19 . 20	21 22 23 24 . 25	26 27 28 29 . 30	31 32 33 34 . 35	36 37 38 39 . 40	41 42 43 44 . 45	46 47 48 49 . 50	51 52 53 54 . 55	56 57 58 59 . 60	61 62 63 64 . 65	66 67 68 69 . 70	71 72 73 74 . 75	76 77 78 79 . 80

EXPLANATIONS: PI_{ij} Initial amount of pollution for pollutant i in lbs./acre or kg/ha, or number of bacteria x 10^X/acre of pollutant i or number of bacteria x 10^X/ha in an area of type j ($PI_{ij} \leqq PM_{ij}$ of DATA CARD 3a of PROGRAM DTCHCK: Quality data)

NOTE: The initial pollution is the amount of pollution available for washoff at the start of a calculation (midnight of the day with the first rainfall).

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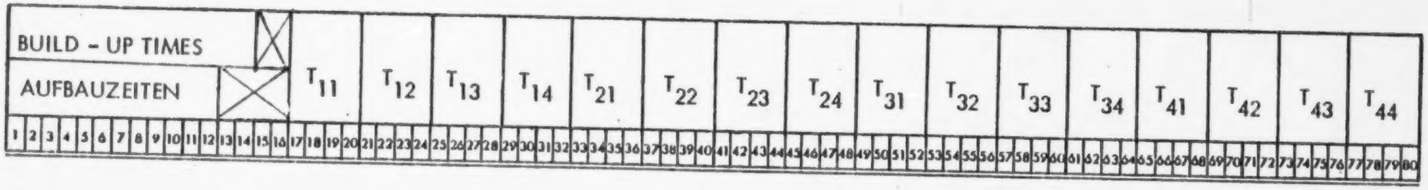
PROGRAM DTCHCK: Quality data DATA CARD 3c: Pollutant build-up times


BUILD - UP TIMES
AUFBAUZEITEN
T11
T12
T13
T14
T21
T22
T23
T24
T31
T32
T33
T34
T41
T42
T43
T44
1 … 80

EXPLANATIONS: This card must contain "BUILD-UP-TIMES" in columns 1 through 14 for english units or "AUFBAUZEITEN" in columns 1 through 12 for metric units.

Tij Time in hours, necessary for build-up of the maximum amount of pollutant i in an area of type j (only integer values), e.g. 240

NOTE: The pollutant build-up times are the times after which the maximum pollution as specified on DATA CARD 3a of PROGRAM DTCHCK: Quality data is reached, e.g. for BOD_5 and COD 240 hours, for TSS 720 hours and for fecal coliforms 24 hours may be used as reference values.

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PROGRAM DTCHCK: Quality data DATA CARDS 3d: Build-up function coefficients

R
S

K_{11}	K_{12}	K_{13}	K_{14}	K_{21}	K_{22}	K_{23}	K_{24}	K_{31}	K_{32}	K_{33}	K_{34}	K_{41}	K_{42}	K_{43}	K_{44}
1 2 3 4 5	6 7 8 9 10	11 12 13 14 15	16 17 18 19 20	21 22 23 24 25	26 27 28 29 30	31 32 33 34 35	36 37 38 39 40	41 42 43 44 45	46 47 48 49 50	51 52 53 54 55	56 57 58 59 60	61 62 63 64 65	66 67 68 69 70	71 72 73 74 75	76 77 78 79 80

EXPLANATIONS: K_{ij} Dimensionless coefficients A, B, C of the build-up function of pollutant i in an area of type j, the values given are multiplied by 10^{-6}.

NOTE: Three cards are necessary; the first of which contains the A-coefficients, the second the B-coefficients and the third the C-coefficients of the following build-up function:

$$Y = 1 - \frac{Ax + 1}{Bx^2 + Cx + 1}$$, whereby x are 5-minute intervals

The following reference values may be used:

Coefficient	A	B	C
BOD_5 and COD	-34.2	1.89	465.2
TSS	-34.7	0.21	86.34
Fecal coliforms	13.34	1133.	3825.

With increasing time between rainfalls the pollution build-up rate is diminishing. This effect is considered by the build-up functions defined.

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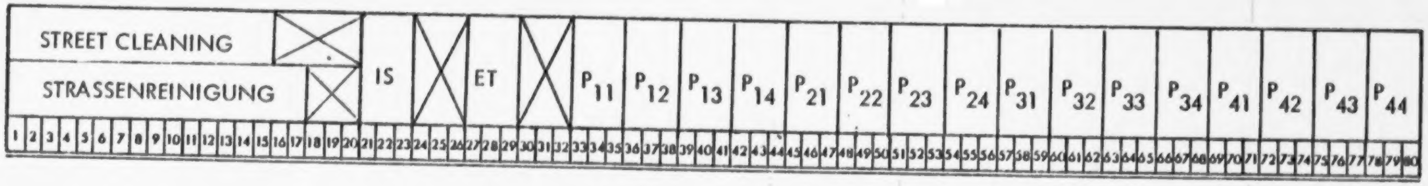
PROGRAM DTCHCK: Quality data DATA CARD 4: Street cleaning


STREET CLEANING
STRASSENREINIGUNG
IS
ET
P11
P12
P13
P14
P21
P22
P23
P24
P31
P32
P33
P34
P41
P42
P43
P44
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card must contain "STREET CLEANING" in columns 1 through 15 for english units or "STRASSENREINIGUNG" in columns 1 through 17 for metric units.

IS	Interval of street cleaning in hours
ET	Time elapsed in hours from last street cleaning until start of simulation (0:00 hours of day with first rainfall)
Pij	Percentage of pollutant i removed by street cleaning in an area of type j, e.g. 10

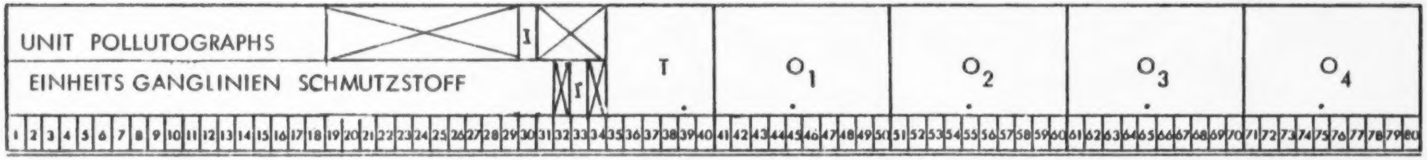
NOTE: The efficiency of street cleaning is mainly a function of the procedure and equipment used and must be taken from local records.

The following figures may be considered as maximum reference values:

BOD_5 and COD	Pij = 35
TSS	Pij = 40
Fecal coliforms	Pij = 30

PROGRAM DTCHCK: Quality data **DATA CARDS 5:** Unit pollutant load hydrographs

R
S


UNIT POLLUTOGRAPHS
I
EINHEITS GANGLINIEN SCHMUTZSTOFF
I
T
O1
O2
O3
O4
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:

I	Number of pollutant (1, 2, 3 or 4) in column 30 for english units or in column 33 for metric units
T	Time in min., e.g. 5.0, 10.0, 15.0, etc.
O_j	Ordinate of unit pollutant load hydrograph I in an area of type j

NOTE: For each pollutant up to 30 cards may be furnished. The first and the last card must contain "UNIT POLLUTOGRAPHS" in columns 1 through 18 for english units or "EINHEITSGANGLINIEN SCHMUTZSTOFF" in columns 1 through 31 for metric units.

The unit pollutant load hydrographs should be derived from rainfall-pollutant load runoff measurements taken or representative catchments. To define the unit pollutant load hydrographs usually for each catchment considered five to ten complete events monitored are necessary as data base. The values given in Appendix 7, Test Example for PROGRAM DTCHCK are not generally transferable on other areas, but will provide approximate shapes and magnitudes for combined systems. For separate systems the values are usually somewhat lower.

The sum of pollutant load hydrograph ordinates may not be equal to 1.0.

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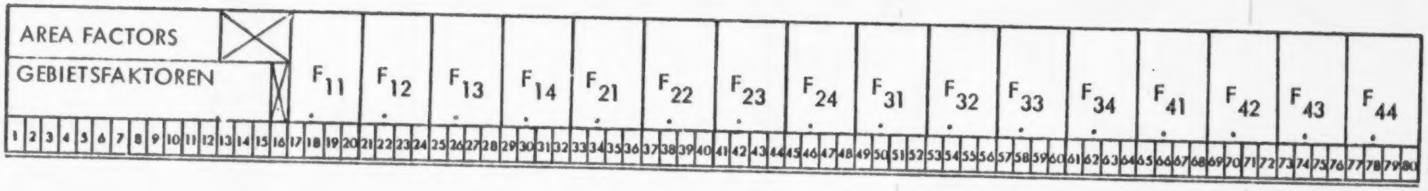
PROGRAM DTCHCK: Quality data DATA CARD 6: Area factors


AREA FACTORS
GEBIETSFAKTOREN
F_{11}
F_{12}
F_{13}
F_{14}
F_{21}
F_{22}
F_{23}
F_{24}
F_{31}
F_{32}
F_{33}
F_{34}
F_{41}
F_{42}
F_{43}
F_{44}
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card must contain "AREA FACTORS" in columns 1 through 12 for english units or "GEBIETSFAKTOREN" in columns 1 through 15 for metric units.

Fij Dimensionless area factor for pollutant i in area of type j (usually all 1.0)

NOTE: The area factors multiply with the ordinates of the unit pollutant load hydrographs as given on DATA CARDS 5, PROGRAM DTCHCK: Quality data. This feature is provided to allow for quick variation the unit pollutant load hydrographs (unit pollutographs) during the calibration process.

PROGRAM DTCHCK: Quality data DATA CARDS 7: Influence of rainfall duration

R
S

RAINFALL ☒ REGENDAUER	T .	R_{11} .	R_{12} .	R_{13} .	R_{14} .	R_{21} .	R_{22} .	R_{23} .	R_{24} .	R_{31} .	R_{32} .	R_{33} .	R_{34} .	R_{41} .	R_{42} .	R_{43} .	R_{44} .
1 2 3 4 5 6 7 8 9 10	11 12 13 14 15 16	17 18 19 20	21 22 23 24	25 26 27 28	29 30 31 32	33 34 35 36	37 38 39 40	41 42 43 44	45 46 47 48	49 50 51 52	53 54 55 56	57 58 59 60	61 62 63 64	65 66 67 68	69 70 71 72	73 74 75 76	77 78 79 80

EXPLANATIONS:

T	Time after start of rainfall in min., e.g. 5.0, 10.0, 15.0, etc.
R_{ij}	Dimensionless influence factor of rainfall duration at time T on pollutant i in an area of type j ($0.0 \leqq R_{ij} \leqq 1.0$)

NOTE: 20 cards are necessary; the first card must contain "RAINFALL" in columns 1 through 8 for english units or "REGENDAUER" in columns 1 through 10 for metric units.

The ability of a rainfall intensity to wash off pollutants is decreasing with increasing rainfall duration. At the beginning of a rainfall R_{ij} = 1.0 (at T = 5.0). At T = 90.0 R_{ij} usually decreases to 0.2 to 0.4. The figures provided in Appendix 7, Test Example for PROGRAM DTCHCK, may be used as reference values.

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EPA-287 (Cin.)
(4-76)

TYPING GUIDE SHEET

PROGRAM DTCHCK: Quality data DATA CARDS 8: Diurnal variation influence

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DIURNAL VARIATION TAGESZEITEINFLUSS	☒	T .	DV_1 .	DV_2 .	DV_3 .	DV_4 .	☒	T .	DV_1 .	DV_2 .	DV_3 .	DV_4 .	☒
1–17	18–20	21–25	26–30	31–35	36–40	41–45	46–50	51–55	56–60	61–65	66–70	71–75	76–80

EXPLANATIONS:

T Time of day in hrs.min, e.g. 10.30

DV_i Dimensionless influence factor of time T of day on pollutant i ($0.0 \leq DV_i \leq 1.0$)

NOTE: 24 cards are necessary; the first must contain "DIURNAL VARIATION" in columns 1 through 17 for english units or "TAGESZEITEINFLUSS" in columns 1 through 17 for metric units.

The values for T in the first card must be 00.00 and 12.00. With each subsequent card these values are increased by half an hour, i.e., 00.30 and 12.30, 01.30 and 13.00, etc.

The change in land use conditions during the day (e.g. traffic conditions) may be accounted by the diurnal variation influence factor. For BOD_5, COD and TSS for instance DV_i usually is 1.0 during rush hours and decreases to 0.8 for night time traffic. For fecal coliforms the influence of solar radiation may be accounted for by $DV_i = 1.0$ during darkness and $DV_i = 0.55$ around noon.

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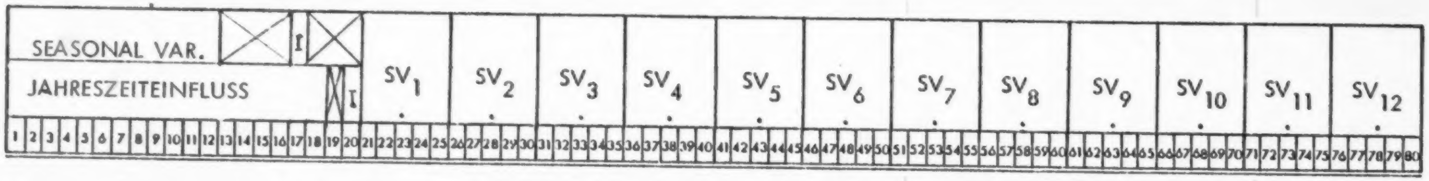
(4-76)

PROGRAM DTCHCK: Quality data DATA CARD(S) 9: Seasonal variation influence

R
S


SEASONAL VAR.
I
JAHRESZEITEINFLUSS
I
SV1
SV2
SV3
SV4
SV5
SV6
SV7
SV8
SV9
SV10
SV11
SV12
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:

I	Number of pollutant (1, 2, 3 or 4) in column 17 for english units or in column 20 for metric units
SV_j	Dimensionless influence of month j (January through December) on pollutant i

NOTE: One card is necessary for each pollutant.

The first card must contain "SEASONAL VAR." in columns 1 through 12 for english units or "JAHRESZEITEINFLUSS" in columns 1 through 18 for metric units.

The maximum pollution accumulating in the drainage areas (see DATA CARD 3a of PROGRAM DTCHCK: Quality data) is dependent on the seasons of the year. For BOD_5, COD and TSS SV_i varies between 0.75 and 1.0. For fecal coliforms SV_i equals 1.0 during summer month and decreases to 0.4 in winter for northern climates.

TYPING GUIDE SHEET

PROGRAM DTCHCK: Quality data **DATA CARDS 10a:** Cleaning effect of detention facilities within the network

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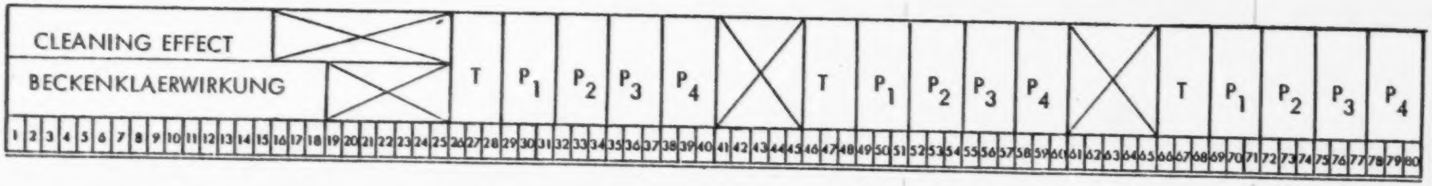
CLEANING EFFECT
BECKENKLAERWIRKUNG
T
P1
P2
P3
P4
T
P1
P2
P3
P4
T
P1
P2
P3
P4
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:

T Detention time in min., e.g. 5, 10, 15, etc.

P_i Percentage to which pollutant i is reduced at time T, e.g. 70

NOTE: 20 cards are necessary; the first should contain "CLEANING EFFECT" in columns 1 through 15 for english units or "BECKENKLAERWIRKUNG" in columns 1 through 18 for metric units.

The values for T on the first card must be 5, 105 and 205 minutes. With each subsequent card these values are increased by 5 minutes, i.e. 10, 110 and 210 minutes.

With increasing detention time the cleaning effect of a basin increases. For BOD_5, COD, TSS and fecal coliforms Appendix 7, Test Example for PROGRAM DTCHCK, provides some reference values which may be adapted to local conditions.

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EPA-287 (Cin.)
(4-76)

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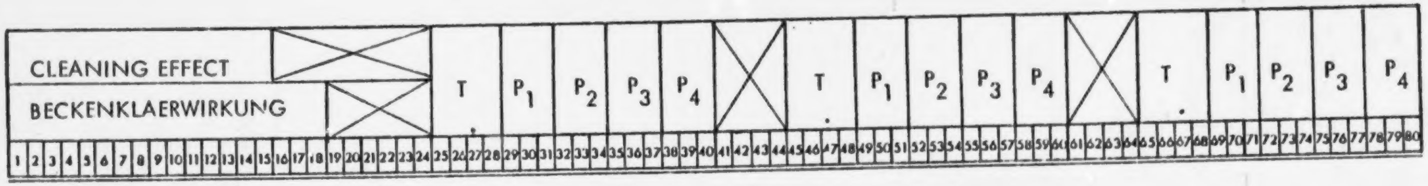
PROGRAM DTCHCK: Quality data **DATA CARDS 10b:** Cleaning effect of storm or combined sewage treatment basins


CLEANING EFFECT
BECKENKLAERWIRKUNG
T
P1
P2
P3
P4
T
P1
P2
P3
P4
T
P1
P2
P3
P4
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:

T Detention time in hrs., e.g. 8.5

P_i Percentage to which pollutant i is reduced at time T, e.g. 55

NOTE: 16 cards are necessary; the first should contain "CLEANING EFFECT" in columns 1 through 15 for english units or "BECKENKLAERWIRKUNG" in columns 1 through 18 for metric units.

The values for T on the first card must be 0.5, 8.5 and 16.5 hours. With each subsequent card these values are increased by 0.5 hours, i.e. 1.0, 8.0 and 17.0 hours.

For reference values see Appendix 7, Test Example for PROGRAM DTCHCK.

PROGRAM DTCHCK: Quality data **DATA CARDS 11a:** Dry-weather flow pollution (diurnal pattern)

R
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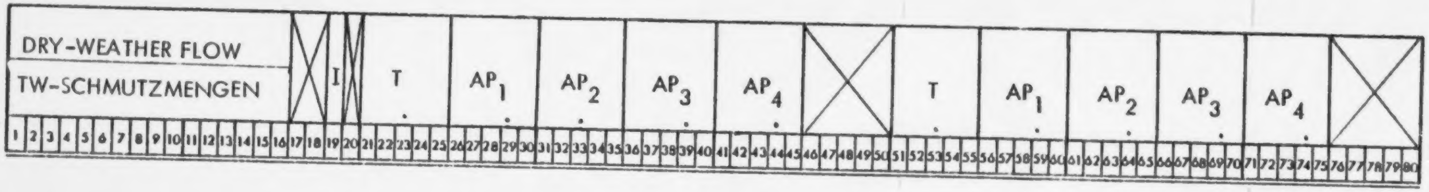
DRY-WEATHER FLOW
TW-SCHMUTZMENGEN
I
T
AP$_1$
AP$_2$
AP$_3$
AP$_4$
T
AP$_1$
AP$_2$
AP$_3$
AP$_4$
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:

I	Number of pollutant (see DATA CARD 2 of PROGRAM DTCHCK: Quality data)
T	Time in hrs.min, e.g. 12.30
AP_j	Concentration of pollution, in mg/l (ppm) or number of bacteria x 10^Y/l in an area of type j (Y is given on DATA CARD 2 of PROGRAM DTCHCK: Quality data).

NOTE: For each pollutant 24 cards are necessary; the first card must contain "DRY-WEATHER FLOW" in columns 1 through 16 for english units or "TW-SCHMUTZMENGEN" in columns 1 through 16 for metric units.

The values for T on the first card must be 00.00 and 12.00. With each subsequent card these values are increased by half an hour, e.g. 00.30 and 12.30.

If local data are available the diurnal variation of dry-weather flow pollution may be accounted for by AP_j. Usually constant AP_j values are sufficient.

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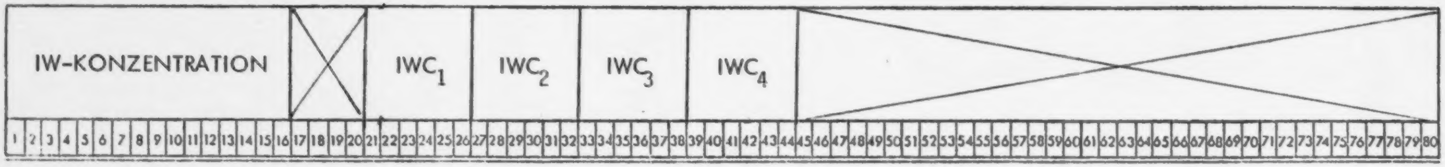
PROGRAM DTCHCK: Quality data DATA CARD 11b: Industrial wastewater pollution S


IW-KONZENTRATION
IWC_1
IWC_2
IWC_3
IWC_4
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card is mandatory and must contain "IW-KONZENTRATION" in columns 1 through 16 for english and metric units.

IWC_i Concentration of pollution i of the industrial wastewater in mg/l (ppm) or number of bacteria x 10^Y/l (Y is given on DATA CARD 2 of PROGRAM DTCHCK: Quality data)

NOTE: The industrial wastewater pollution given on this card applies to all industrial wastewater inflows IW as specified on DATA CARD(S) 8a of PROGRAM DTCHCK: Network data except for those catchments for which on DATA CARD(S) 11c, PROGRAM DTCHCK: Quality data, special industrial wastewater pollution values are provided.

This card must not be contained for receiving water calculations.

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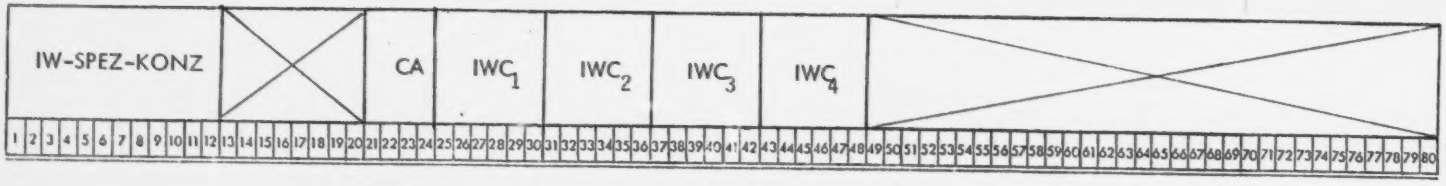
PROGRAM DTCHCK: Quality data DATA CARD(S) 11c: Special industrial wastewater pollution S


IW-SPEZ-KONZ
CA
IWC1
IWC2
IWC3
IWC4
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card must contain IW-SPEZ-KONZ" in columns 1 through 12 for english and metric units.

CA Name of drainage area

IWC_i Concentration of pollution of special industrial wastewater for drainage areas in mg/l (ppm) or number of bacteria x 10^Y/l (Y is given on DATA CARD 2 of PROGRAM DTCHCK: Quality data).

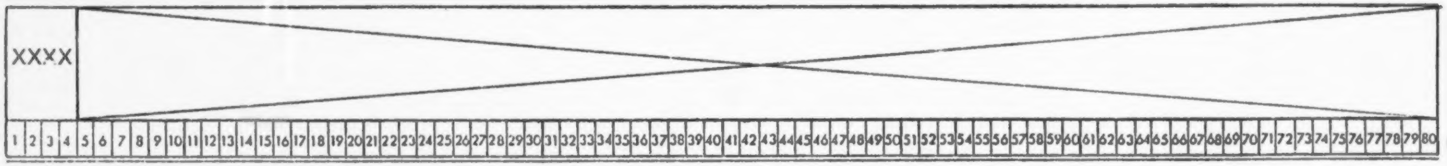
NOTE: See also DATA CARD 11b, PROGRAM DTCHCK: Quality data.

The special industrial wastewater pollution again applies to the industrial wastewater inflows IW as specified for the corresponding catchments on DATA CARD(S) 8a of PROGRAM DTCHCK: Network data and is included only, if this industrial wastewater pollution differs from the value IWC_i provided on DATA CARD 11b of PROGRAM DTCHCK: Quality data.

A maximum of 20 cards is allowed.

These cards must not be contained for receiving water calculations.

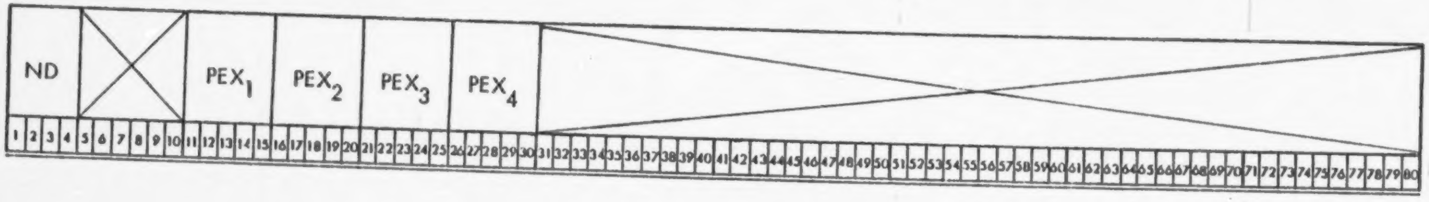
PROGRAM DTCHCK: Quality data **DATA CARD 11d:** Dry-weather flow pollution end card R S


XXXX
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card is mandatory and must contain XXXX in columns 1 through 4.

PROGRAM DTCHCK: Quality data **DATA CARD(S) 12a:** Constant external loading pollution

R
S


ND
PEX$_1$
PEX$_2$
PEX$_3$
PEX$_4$
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:

ND	Name of boundary node with constant external loading
PEX$_i$	Concentration of pollution of external loading in mg/l (ppm) or number of bacteria x 10^Y/l for pollutant i (Y is given on DATA CARD 2 of PROGRAM DTCHCK: Quality data)

NOTE: Any number of cards may be read in, but only loadings at nodes specified on DATA CARD 3i of PROGRAM DTCHCK: Network data are considered.

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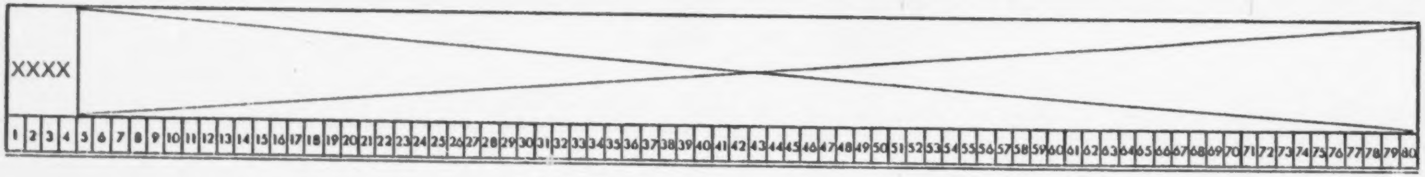
PROGRAM DTCHCK: Quality data

DATA CARD 12b: End of constant external loading pollution


XXXX
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card is mandatory and must contain XXXX in columns 1 through 4

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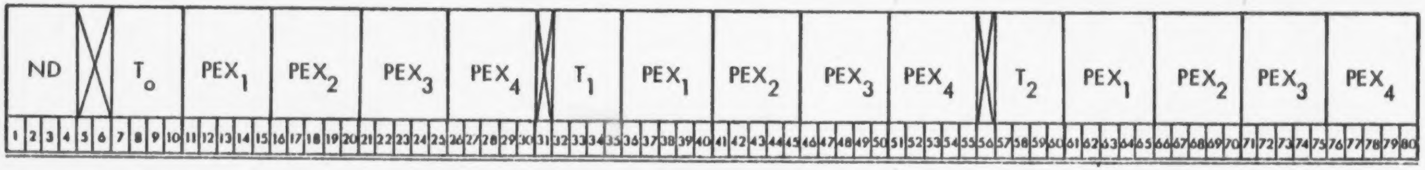
PROGRAM DTCHCK: Quality data

DATA CARDS 12c: Variable external loading pollution (pollutographs)

R
S


ND
T_o
PEX_1
PEX_2
PEX_3
PEX_4
T_1
PEX_1
PEX_2
PEX_3
PEX_4
T_2
PEX_1
PEX_2
PEX_3
PEX_4
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:

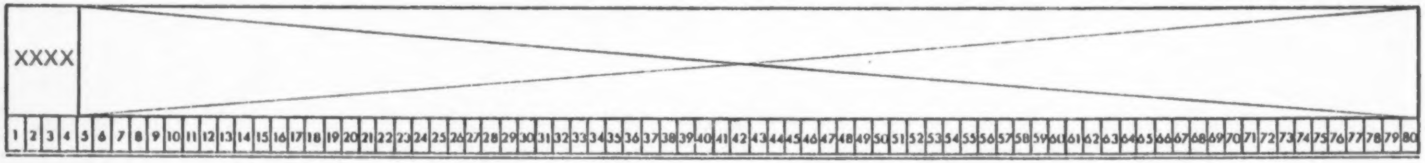
ND	Name of boundary node with variable external loading (hydrograph)
T_i	Time in min. The values must increase in 5-minute steps, the first value (T_o) must be zero, e.g. 0, 5, 10, etc.
PEX_j	Concentration of pollution of external loading in mg/l (ppm) or number of bacteria x 10^Y/l at time T_i for pollutant j (Y is given on DATA CARD 2 of PROGRAM DTCHCK: Quality data)

NOTE: The end of a pollutograph is marked by a negative time value (e.g. -1). One pollutograph may contain up to 289 time values (T_o plus 288 intervals).

Any number of pollutographs may be read in, but only the hydrographs at nodes, specified on DATA CARD 3j of PROGRAM DTCHCK: Network data, are considered for single event simulations.

PROGRAM DTCHCK: Quality data DATA CARD 12d: End of variable external loading pollution

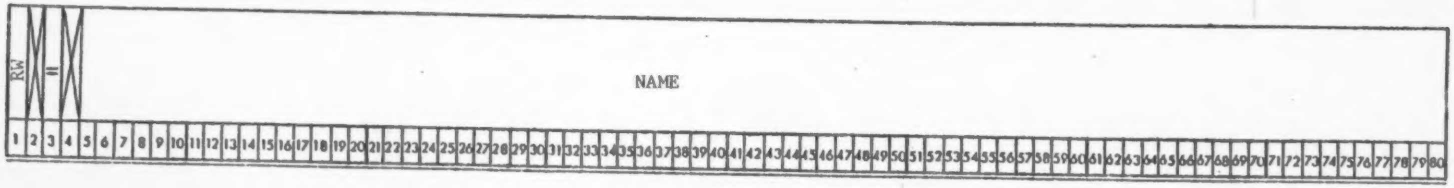
R
S


XXXX
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card is mandatory and must contain XXXX in columns 1 through 4.

TYPING GUIDE SHEET

PROGRAM DTCHCK: Quality data DATA CARD 13a: Receiving water title card


RW
=
NAME
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS:		
	RW	Number of receiving water (1 or 2)
	NAME	The name must match the name supplied for the corresponding receiving water on DATA CARD 13a of PROGRAM DTCHCK: Quantity data

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PROGRAM DTCHCK: Quality data DATA CARDS 13b: Receiving water pollution

RW	☒	RQL	RQU	☒	I	☒	RAP_1	RAP_2	RAP_3	RAP_4	RAP_5	RAP_6	RAP_7	RAP_8	RAP_9	RAP_{10}	RAP_{11}	RAP_{12}
1	2 3	4 5 6 7 8 9	10 11 12 13 14 15	16 17	18	19 20	21 22 23 24 25	26 27 28 29 30	31 32 33 34 35	36 37 38 39 40	41 42 43 44 45	46 47 48 49 50	51 52 53 54 55	56 57 58 59 60	61 62 63 64 65	66 67 68 69 70	71 72 73 74 75	76 77 78 79 80

EXPLANATIONS:

RW	Number of receiving water according to DATA CARD 13a, PROGRAM DTCHCK: Quality data
RQL	Lower limit of receiving water discharge range in cfs or m^3/s (RQL < RQU)
RQU	Upper limit of receiving water discharge range in cfs or m^3/s (RQU > RQL)
I	Number of pollutant
RAP_i	Concentration of receiving water background pollution in mg/l (ppm) or number of bacteria x 10^Y/l which applies for the discharge range RQL to RQU dependent on the months of the year (January, i = 1, through December, i = 12) (Y is given on DATA CARD 2, PROGRAM DTCHCK: Quality data)

NOTE: 2 to 20 ranges given on subsequent card groups, which contain one card for each pollutant, are permitted. The range limits on the sequential card groups must be increasing, e.g.:

Receiving water 1, range 1, pollutant 1
Receiving water 1, range 1, pollutant 2
Receiving water 1, range 2, pollutant 1
Receiving water 1, range 2, pollutant 2
Receiving water 2, range 1, pollutant 1, etc.

The number of ranges must be the same for both receiving waters.

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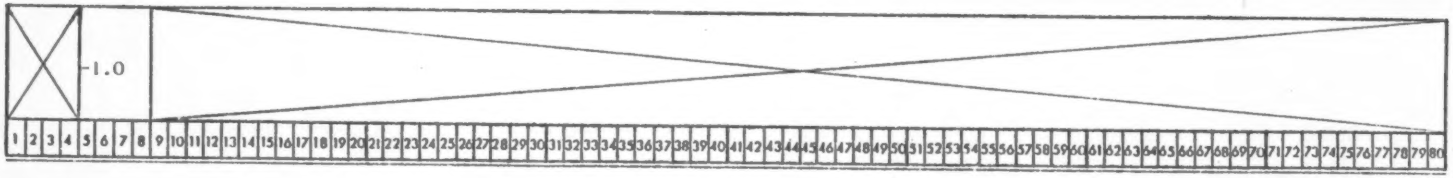
PROGRAM DTCHCK: Quality data DATA CARD 13c: End of receiving water pollution

R
S


-1.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: The end of the pollution figures of a receiving water is marked by this card, containing -1.0 in columns 5 through 8

NOTE: Subsequently follows DATA CARD 13a for the second receiving water, if existing, as well as the sequence of cards specified on DATA CARDS 13b. Again the end is marked by DATA CARD 13c.

This is the last card of the Quality data set.

APPENDIX 3

ERROR (F) AND INFORMATIVE MESSAGES OF THE PROGRAM DTCHCK

GERMAN	ENGLISH
(F) ABSCHLUSS DER DATEN FEHLT, ES SIND NOCH WEITERE DATEN VORHANDEN	The end card of data check is missing, additional cards are existing.
(F) ANFANGSZEITPUNKT = ... UHR .... MINUTEN	The start of rainfall at ... hours .... minutes does not match with the duration of the event provided.
(F) ANZAHL DER JAHRE = ... IST NICHT ZULAESSIG	A number of ... years is not admitted.
(F) ANZAHL DER REGENINTERVALLE GROESSER ALS MAXRND, KARTE NUMMER ...	The number of precipitation intervals is larger than MAXRND, card number ....
(F) ANZAHL DER REGENMESSREIHEN = ...	The number of precipitation records is specified as ... and does not match with the precipitation data supplied.
(F) ANZAHL INTERESSANTER KNOTEN ..., MAX. ZULAESSIG	The total number of nodes of interest is ..., only ... are allowed.
(F) AUFBAUZEITENKARTEN FALSCH GEKENNZEICHNET	The card containing the built-up times is identified false.
(F) AUSGABEKNOTEN (RHB) DER ... UND DER .... KNOTEN SIND GLEICH	The printout nodes (basins) ... and .... are provided twice.
(F) AUSGABEKNOTEN (RUE) DER ... UND DER .... KNOTEN SIND GLEICH	The printout nodes (overflow structures) ... and .... are provided twice.
(F) AUSGABEROHRE DAS ... UND DAS .... ROHR SIND GLEICH	The printout segments ... and .... are provided twice.

(F) BEIDE VORFLUTER HABEN DIE NUMMER VORFL = ...	Both receiving waters are indicated by the number ....
(F) BEREICHSLUECKE ODER UEBERSCHREITUNG VON DER ... BIS .... KARTE	There is a gap or overlap in the ... to .... card.
(F) BEZEICHNUNG OHNE GEBIETSART GEGEBEN	The identification is given without coordination to drainage area type.
(F) DAS AUSGABEROHR KA = ... KE = ... IST NICHT IM NETZ ENTHALTEN	The printout segment with the upper node ... and the lower node .... is not contained in the network.
(F) DAS JAHR .... MESSREIHE ... BEREITS VORHANDEN ODER ZWISCHEN ZWEI MESSREIHEN FEHLT	The year .... for precipitation record ... is already existing or the year in-between two precipitation records is missing.
(F) DAS NETZ ENTHAELT .... BECKEN, ... SIND NUR ZULAESSIG	The network contains .... basins, ... only are allowed.
(F) DAS NETZ ENTHAELT KEINE SONDERBAUWERKE	The network does not contain special structures.
(F) DAS NETZ ENTHAELT KEINE SONDERBAUWERKE. SONDERBAUWERKSKARTEN USW. FEHLEN	The network contains no special structures. Input cards for special structures are missing.
(F) DAS NETZ ENTHAELT .... KNOTEN, ... SIND NUR ZULAESSIG	The network contains a number of .... nodes, ... only are allowed.
(F) DAS NETZ ENTHAELT .... UEBERLAEUFE, ... SIND NUR ZULAESSIG	The network contains .... overflows, ... only are allowed.
(F) DAS ROHR KNA ... KNE .... EXISTIERT NICHT ODER DARF KEIN GESTEUERTES ROHR SEIN	The sewer segment with the upper node ... and the lower node .... is not existing or may not be a segment containing a control gate.
(F) DAS ROHR KNA = ... KNE = ... SOLL IN ZWEI ROHRE GETEILT WERDEN	The sewer segment with the upper node ... and the lower node .... should be subdivided into two segments.

(F) DATENKARTEN FALSCH GEKENNZEICHNET	The data cards are specified wrong.
(F) DATENKARTEN FEHLEN	Data cards are missing.
(F) DEN ZUFLUSSKNOTEN ... DES ROHRES KA = ..., KE = ... (LFN ..) GIBT ES NICHT	The in-going node ... of the sewer segment with the upper node ... and the lower node .... is not existing (sequential number ..).
(F) DER AUSGABEKNOTEN (RHB) ... IST NICHT IM NETZ ENTHALTEN	The printout node (basin) ... is not contained in the network.
(F) DER AUSGABEKNOTEN (RUE) ... IST NICHT IM NETZ ENTHALTEN	The printout node (overflow structure) is not contained in the network.
(F) DER AUSGABEKNOTEN (RUE) ... IST KEIN REGENUEBERLAUF	The printout node (overflow structure) ... is no overflow.
(F) DER AUSGABEKNOTEN (RHB) ... IST KEIN SONDERBAUWERK MIT BECKEN	The printout node ... (basin) is no basin.
(F) DER GRENZKNOTEN ... IST NICHT IM VORFLUTERNETZ ENTHALTEN	The node at the calculation area boundary ... is not contained in the receiving water system.
(F) DER INTERESSANTE KNOTEN ... DARF NUR EINEN ABFLUSS HABEN	The interesting node ... may have only one outflow.
(F) DER INTERESSANTE KNOTEN .... HAT ... ZUFLUESSE, ER MUSS ZWEI HABEN	The interesting node .... has ... inflows, exactly two must be specified.
(F) DER INTERESSANTE KNOTEN ... IST KEIN BECKENBAUWERK	The interesting node ... is no basin.
(F) DER INTERESSANTE KNOTEN ... LIEGT NICHT IM VORFLUTER	The interesting node ... is not located in the receiving water system.
(F) DER INTERESSANTE KNOTEN ... MUSS EIN AUSLASSROHR UND EIN VORFLUTERELEMENT ALS ZUFLUESSE HABEN	The interesting node ... must have one sewer segment and one receiving water system element as inflows.
(F) DER KNOTEN ... DARF KEIN STEUERORGAN SEIN	The node ... may not be a control gate.

(F) DER KNOTEN ... DARF KEIN UEBERNAHMEKNOTEN SEIN (SONDERBAUWERK ODER VERZWEIGUNG)	The node ... may not be loaded by an external loading (special structure or branching point).
(F) DER KNOTEN .... HAT ZWEI ABFLUESSE (BAUWERKSTYP ...)	The node .... has two outflows (structure type ...).
(F) DER KNOTEN ... IST EINE VERZWEIGUNG ODER EIN SONDERBAUWERK	The node ... is a branching point or a special structure.
(F) DER KNOTEN ... IST IN DEM NETZDATENFILE NICHT AUFGEFUEHRT	The node ... is not mentioned in the file network data.
(F) DER KNOTEN ... IST KEIN ABFLUSSKNOTEN DES KNOTEN ... (LFN ..)	The node ... is not an outflow node of the node ... (sequential number ..).
(F) DER KNOTEN ... IST MEHRFACH AUFGEFUEHRT	The node ... is mentioned several times.
(F) DER KNOTEN ... MIT KONSTANTER UEBERNAHME IST NICHT IM NETZ ENTHALTEN	The node ... with a constant external loading is not contained in the network.
(F) DER KNOTEN ... MIT VARIABLER UEBERNAHME IST NICHT IM NETZ ENTHALTEN	The node ... with a variable external loading is not contained in the network.
(F) DER KNOTEN ... TAUCHT DREIMAL ALS ANFANGSKNOTEN AUF	The node ... is used three times as beginning node.
(F) DER KNOTEN ... TAUCHT VIERMAL ALS ENDKNOTEN AUF	The node ... is used four times as lower node of a sewer segment.
(F) DER MITTELWERT VON KOORDINATEN MUSS = 1 SEIN	The average value of the coordinates must be equal to one.
(F) DER REGEN JAHR ... MONAT ... TAG ... INT ... DAUER ... GEHT UEBER DIE REIHENUNTERBRECHUNG REIHE NUMMER ...	The precipitation event, year ..., month ..., day ..., interval ..., duration ..., overlaps with the interruption of the precipitation record number ....
(F) DER SPEZIELLE INTERESSANTE KNOTEN ... FEHLT	The node of special interest ... is missing.
(F) DER SPEZIELLE INTERESSANTE KNOTEN ... IST NICHT IM NETZ ENTHALTEN	The node of special interest ... is not contained in the network.

(F) DER UEBERNAHMEKNOTEN ... FEHLT	The boundary node with the external loading ... is missing.
(F) DER UEBERNAHMEKNOTEN ... IST ZWEIMAL VORHANDEN	The boundary node with the external loading ... is existing twice.
(F) DER ZUFLUSS ... DES ROHRES KA = ..., KE = ... IST NICHT ANGEGEBEN ES GIBT EIN KA = ..., KE = ...	The inflow ... of the sewer segment with the upper node ... and the lower node .... is not specified. There is a sewer segment with the upper node ... and the lower node .....
(F) DIE ABSCHLUSSKARTE FEHLT ODER DATEN VORHANDEN OBWOHL KEINE KNOTEN IN NETZDATEN AUFGEFUEHRT	The end card is missing or data are existing eventhough the nodes are not mentioned in the network data.
(F) DIE ANZAHL DER BEREICHE IN DEN BEIDEN VORFLUTERN IST NICHT GLEICH	The number of ranges are not equal for the two receiving waters.
(F) DIE EINHEITSGANGLINIEN UMFASSEN .... KARTEN, ... SIND NUR ZULAESSIG	The unit hydrographs contain .... cards, ... only are admitted.
(F) DIE EINSKARTE FEHLT ODER ANZAHL DER REGENKARTE IST FALSCH, KARTE NUMMER ...	The "one" card is missing or the number of precipitation cards is wrong, card number ....
(F) DIE ERSTE KARTE FALSCH GEKENNZEICHNET	The first card is identified wrong.
(F) DIE FOLGENDEN KNOTEN BILDEN EINE NETZSCHLEIFE	The following nodes form a network loop.
(F) DIE KARTE ... ENTHAELT DEN NAMEN DES TEILEINZUGSGEBIETES, DAS NICHT VORHANDEN IST	The card ... contains the name of a drainage area, which is not existing.
(F) DIE KARTE ... ENTHAELT KEINE BLANKS IN DEN ERSTEN ZWANZIG SPALTEN ODER ZU VIELE KARTEN VORHANDEN	The card ... does not contain blanks in the first twenty columns or too many cards are existing.
(F) DIE ... KARTE ENTHAELT KEINE KNOTENANGABE	The ... card contains no node name.
(F) DIE KARTE FALSCH GEKENNZEICHNET	The card is identified wrong.

(F) DIE NULLKARTE FEHLT KARTE NUMMER ...	The "zero" card is missing, card number ....
(F) DIE NUMMER DER GEBIETSBEZEICHNUNGEN STIMMEN NICHT	The numbers of the drainage area types do not match.
(F) DIE NUMMER DES VORFLUTERS MUSS ... SEIN	The number of the receiving water must be ....
(F) DIE NUMMERN DER SCHMUTZSTOFFBEZEICHNUNGEN STIMMEN NICHT	The numbers of the pollutants disagree.
(F) DIE SOHLE DER DROSSEL LIEGT TIEFER ALS DIE SOHLE DES BECKENS ODER HOEHER ALS DIE SCHWELLE	The invert of the throttle sewer is lower than the invert of the basin or above the weir crest.
(F) DIE SOHLE DER DROSSEL LIEGT UEBER DER SOHLE DES REGENUEBERLAUFES	The invert of the throttle sewer is above the invert of the overflow structure.
(F) DIE SOHLE DES AUSLAUFROHRES LIEGT TIEFER ALS DIE SOHLE DES BECKENS	The invert of the outgoing segment is lower than the basin invert.
(F) DIE TEMPERATURKARTEN ENTHALTEN MEHR ALS ... VERSCHIEDENE JAHRESANGABEN	The temperatures cards contain more than ... different years.
(F) DIE ... UND DIE .... PROFILKARTE HABEN DIE GLEICHE PROFILKENNZAHL	The ... and the .... cross section cards have the same identifier.
(F) DRITTE KARTE MIT DER JAHRESZAHL ... (LFN ..)	There is a third card with the year ... (sequential number ..).
(F) ENDZEITPUNKT = ... UHR .... MINUTEN	The concluding time of the event ... hours .... minutes does not match with the start of event and the number of precipitation data provided.
(F) EIN TAG (= 1440 MINUTEN) IST KEIN GANZZAHLIGES VIELFACHES VON DT = ... MINUTEN	One day is not a even numbered multiple of DT = ... minutes.
(F) EINZELEREIGNISRECHNUNG BEGINNT AM ...	The single event simulation begins at ....
(F) ERSTE KARTE FALSCH GEKENNZEICHNET	The first card is identified wrong.

(F) ERSTE KARTE FALSCH GEKENNZEICHNET ODER ZU VIELE KARTEN FUER TW-ABFLUESSE VORHANDEN	The first card is identified wrong or too many cards for dry-weather flows are existing.
(F) ES FEHLEN DATEN FUER ... JAHRE	Data cards are missing for ... years.
(F) ES SIND .... SPEZIELLE INTERESSANTE KNOTEN AUFGEFUEHRT (... SIND ZULAESSIG). ES MUSS MINDESTENS EIN INTERESSANTER KNOTEN ANGEGEBEN SEIN	.... nodes of special interest are given (only ... are allowed). At least one node of special interest must be provided.
(F) ES SIND ZWEI NULLKARTEN HINTEREINANDER VORHANDEN KARTE NUMMER ...	Two "zero" cards are in sequence, card number ....
(F) ES WERDEN .... PROFILKENNZAHLEN VERLANGT, ... SIND NUR ZULAESSIG	.... cross section identifiers are requested, ... are permissible.
(F) ES WURDEN ... REGENINTENSITAETSKARTEN EINGELESEN, 288 SIND NUR ZULAESSIG	... precipitation intensities were supplied, 288 only are permitted.
(F) FEHLER IN DEM NETZDATENFILE DIE DATEN WERDEN UEBERLESEN	There is an error in the file network data, the data are ignored.
(F) FILE IF07 LEER (SYSTEMDATEN KANALNETZ)	File IF07 is empty (system data of the sewer network).
(F) FORMATFEHLER AUFBAUZEITEN	There is a format error in the built-up times.
(F) FORMATFEHLER AUFGETRETEN, EVENTUELL FEHLT ENDE-KARTE DER ROHRELEMENTKARTEN	A format error was encountered, possibly the end card of the sewer segment cards is missing.
(F) FORMATFEHLER IN DEN DATENKARTEN	There is a format error in the data cards.
(F) FORMATFEHLER IN DER GEBIETSFAKTORENKARTE	There is a format error in the drainage area coefficient card.
(F) FORMATFEHLER IN DER ... KARTE	There is a format error in the ... card.
(F) FORMATFEHLER IN DER ... KARTE (GEBIET = ..., KN = ...)	There is a format error in the ... card (drainage area ...., node ...).

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(F) FORMATFEHLER IN DER ... KARTE (KNOTEN ....)	There is a format error in the ... card (node ....).
(F) FORMATFEHLER IN DER ... KARTE (KNOTEN ...., DROSSELKARTE)	There is a format error in the ... card (node ...., throttle sewer card).
(F) FORMATFEHLER IN DER ... KARTE ODER ZU WENIGE KARTEN VORHANDEN	There is a format error in the ... card or not enough cards are existing.
(F) FORMATFEHLER IN DER KONSTANTENKARTE	Format error in the constant card.
(F) FORMATFEHLER IN DER ... PROFILKARTE	There is a format error in the ... cross section card.
(F) FORMATFEHLER IN DER TITELKARTE	There is a format error in the title card.
(F) FORMATFEHLER IN DER UEBERNAHMEGANGLINIE DES KNOTENS ...	There is a format error in the external loading hydrograph of the node ....
(F) FORMATFEHLER INITIALISIERUNGSKARTE	There is a format error in the initialisation card.
(F) FORMATFEHLER INITIALISIERUNGSWERTE	There is a format error in the initialisation values.
(F) FORMATFEHLER JAHRESZEITENEINFLUSSKARTE	There is a format error in the seasonal variation influence card.
(F) FORMATFEHLER ... KARTE	There is a format error in the ... card.
(F) FORMATFEHLER ... KARTE (KLAERWIRKUNG)	There is a format error in the ... card (retention efficiency).
(F) FORMATFEHLER KOEFFIZIENTENKARTE	There is a format error in the coefficient card.
(F) FORMATFEHLER MAXIMALE SCHUTZWERTE	There is a format error for the maximum pollutant load available on drainage areas.
(F) FORMATFEHLER STRASSENREINIGUNGSKARTE	There is a format error in the card defining street cleaning.
(F) FUER DAS JAHR ... FEHLEN DIE TEMPERATURDATEN	For the year ... the temperature data are missing.

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(F) FUER DAS JAHR .... FEHLEN VORFLUTERABFLUESSE EINZELEREIGNISRECHNUNG BEGINNT AM ... ... UHR ... MINUTEN	For the year .... the receiving water runoff data are missing. The single event simulation begins at ... ... hour ... minutes.
(F) FUER DAS JAHR ... IST NUR EINE TEMPERATURKARTE VORHANDEN	For the year ... only one temperature card is existing.
(F) FUER DAS JAHR ... SIND NICHT ALLE MINIMALTEMPERATUREN NICHT KLEINER ALS DIE MAXIMALTEMPERATUREN	For the year ... not all minimum temperatures specified are smaller than the maximum temperatures given.
(F) FUER DEN KNOTEN ... IST EINE VIERTE TEILEINZUGSGEBIETSKARTE VORHANDEN (LFN ..)	For the node ... a fourth drainage area card is existing (sequential number ..).
(F) FUER DEN LETZTEN KNOTEN .... IST NUR ... DROSSELKARTE VORHANDEN	For the last node .... only ... throttle sewer card is existing.
(F) FUER DEN UEBERNAHMEKNOTEN ... SIND ZWEI GANGLINIEN VORHANDEN	For the boundary node with an external loading ... two loading hydrographs are existing.
(F) FUER LASTFALL = ... DARF KEIN ENDZEITPUNKT GEGEBEN SEIN	For the condition C = ... provided on data card 2 of the file network data no concluding date and time may be given.
(F) GEBIETSART = ... BEZEICHNUNG FEHLT	For the drainage area type ... the identification is missing.
(F) GEBIET = ... DER KNOTEN KN = ... IST NICHT IM NETZ ENTHALTEN (LFN ..)	Drainage area ..., the node .... is not contained in the network (sequential number ..).
(F) GEBIETSFAKTORENKARTE FALSCH GEKENNZEICHNET	The drainage area coefficient card is identified wrong.
(F) HMIN GROESSER ALS HMAX	HMIN is larger than HMAX.
(F) IM JAHR ... MONAT .... SIND MIN UND MAX TEMPERATUREN = NULL	In the year ... month .... the minimum and maximum temperatures are zero.
(F) INITIALSISIERUNGSKARTE FALSCH GEKENNZEICHNET	The initialisation card is identified wrong.

(F) INTERESSANTE KNOTEN DER ... UND DER .... KNOTEN SIND GLEICH	The nodes of interest ... and .... are similar.
(F) INTERESSANTER KNOTEN ... IST NICHT IM NETZ	The interesting node ... is not contained in the network.
(F) JAHR 19.. ABFLUESSE FUER DIE MONATE ... BIS .... VORHANDEN	Year 19.. The runoff data for the month ... to .... are existing.
(F) JAHRESKARTE: JAHR ... FAELLT NICHT IN DEN ANGEGEBENEN ZEITRAUM DER RECHNUNG	The year provided ... is not contained in the timespan to be simulated.
(F) .... JAHR IN DER MESSREIHE ... FEHLT	The year .... is missing in the precipitation record ....
(F) ... KARTE DEN KNOTEN ... GIBT ES NICHT	... card, the node .... is not existing.
(F) ... KARTE ELEMENTTYP NICHT PROGRAMMIERT	... card, this type of element cannot be handled by the program.
(F) ... KARTE HMAX = 0 ODER NEGATIV	... card, HMAX = 0 or negativ.
(F) KARTE SCHMUTZSTOFFNUMMER FALSCH ODER KARTE NICHT RICHTIG EINGEORDNET	The card containing the pollutant numbers is wrong or in the wrong order.
(F) KARTE VQU = ... VQO = ... ENTSPRICHT NICHT DER VORHERGEHENDEN KARTE	The card VQU = ... VQO = ... does not match with the preceeding card.
(F) KEINE DATEN FUER MESSREIHE ... VORHANDEN	No data for rainfall record ... existing.
(F) KEINE GEBIETSARTEN VORGEGEBEN	There are no drainage area types specified.
(F) KEINE KARTEN VORHANDEN	No cards are existing.
(F) KEINE SCHMUTZSTOFFE VORGEGEBEN	No pollutants are provided.
(F) KNOTEN = ... BEIDE DROSSELN HABEN DIE GLEICHE BEZEICHNUNG E = ...	Node ..., both throttle sewers have the same name E = ...

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(F) KNOTEN ... DAS BAUWERK HAT KEINEN ABFLUSS	Node ... the structure has no outflow.
(F) KNOTEN = ... DIE BECKENSOHLE LIEGT HOEHER ALS DIE SCHWELLE DES REGENUEBERLAUFS (LFN ..)	Node ..., the basin invert is above the weir crest of the overflow (sequential number ..).
(F) KNOTEN = ... DIE ... DROSSELKARTE GEHOERT NICHT ZUM KNOTEN (KN = ...) (LFN ..)	Node ...., the ... throttle sewer card does not belong to the node (...) (sequential number ..).
(F) KNOTEN = ... DIE DROSSEL 2 LIEGT HOEHER ALS DIE BECKENSOHLE	Node ..., the throttle sewer 2 is higher than the basin invert.
(F) KNOTEN ... DIE SCHWELLE DES UEBERLAUFS LIEGT HOEHER ALS DIE DECKE DES BECKENS	Node ..., the weir crest of the overflow is above the basin ceiling.
(F) KNOTEN = ... DIE SOHLE DER DROSSEL LIEGT NICHT TIEFER ALS DIE DECKE DES BECKENS	Node = ..., the invert of the throttle sewer is not lower than the basin ceiling.
(F) KNOTEN = ... DIE SOHLE DER DROSSEL LIEGT TIEFER ALS DIE SOHLE DES BECKENS ODER HOEHER ALS DIE SCHWELLE	Node ..., the invert of the throttle sewer is lower than the invert of the basin or higher than the overflow.
(F) KNOTEN = ... DIE SOHLE DER DROSSEL LIEGT TIEFER ALS DIE SOHLE DES UEBERLAUFS ODER HOEHER ALS DIE SCHWELLE	Node ..., the invert of the throttle sewer is lower than the invert of the overflow structure or higher than the weir crest.
(F) KNOTEN = ... DIE SOHLE DES AUSLAUFROHRES LIEGT TIEFER ALS DIE SOHLE DES BECKENS	Node ..., the invert of the outgoing segment is lower than the invert of the basin.
(F) KNOTEN = ... DIE SOHLE DES UEBERLAUFROHRES LIEGT HOEHER ALS DIE SCHWELLE	Node ..., the invert of the segment behind the overflow is higher than the weir crest.
(F) KNOTEN = ... DROSSELBEZEICHNUNG FALSCH E = ... (LFN ..)	Node ... throttle definition is wrong E = ... (sequential number ..).
(F) KNOTEN = ... DROSSELKARTE, KEIN POSITIVES GEFAELLE (LFN ..)	Node ..., check throttle sewer card, inverse slope (sequential number ..).

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(F) KNOTEN = ... DROSSELKARTE, KS = ... LIEGT NICHT INNERHALB DER VORGEGEBENEN GRENZEN (... UND ... BZW. ... UND ...) (LFN ..)	Node ...., throttle sewer card. The friction factor ... is not between the limits given ... and .... or ... and ... respectively (sequential number ..).
(F) KNOTEN = ... DROSSELKARTE, LAENGE = ... (LFN ..)	Node ...., check throttle sewer length = ... (sequential number ..).
(F) KNOTEN = ... DROSSELKARTE, PROFILBREITE = ... (LFN ..)	Node .... check throttle sewer profile width = ... (sequential number ..).
(F) KNOTEN = ... DROSSELKARTE PROFILKENNZAHL FEHLT (LFN ...)	Node ..., throttle sewer card cross section code is missing (sequential number ..).
(F) KNOTEN ... PARAMETER FUER DIE VERWEILDAUER FALSCH	Node ..., the switch for the retention time is wrong.
(F) KNOTEN .... PROFILKARTE FEHLT FUER DIE ... DROSSEL PKZ = ..	Node ...., the cross section card for the throttle sewer ... (cross section code = ..) is missing.
(F) KNOTEN = ... UNZULAESSIGER BAUWERKSTYP (LFN ..)	Node ..., unallowed type of structure (sequential number ..).
(F) KNOTEN = ... ZWEI KARTEN VORHANDEN (LFN ..)	Node ..., two cards are existing (sequential number ..).
(F) KONSTANTENKARTE KS-WERT .... LIEGT NICHT INNERHALB DER VORGEGEBENEN GRENZEN ... UND ... BEZ. ... UND ...	The friction factor .... given on the constant card is not within the limits allowed of ... and ... or ... and ... respectively.
(F) LASTFALL = ... INTERVALLANZAHL = ...	For the condition C = ... provided on data card 2 of the file network data the simulation period of .... intervals is not allowed.
(F) LASTFALL = ... IST NICHT ZULAESSIG	The condition C = ... provided on data card 2 of the file network data does not agree with the other data supplied.
(F) MAXIMALE ANZAHL DER STEUERORGANE UEBERSCHRITTEN	The number of control gates allowed is exceeded.

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(F) MAXIMALE ANZAHL VON KONSTANTEN UEBERNAHMEN ... UEBERSCHRITTEN, DARUEBERHINAUS GEHENDE KONSTANTE UEBERNAHMEN WERDEN IGNORIERT	The number of boundary nodes with constant external loadings of ..., allowed at a maximum, are exceeded, the surplus of constant loadings is ignored.
(F) MAXIMALE ANZAHL VON TEILEINZUGSGEBIETEN (...) UEBERSCHRITTEN	The maximum number of drainage areas (...) is exceeded.
TEILEINZUGSGEBIETE WERDEN IGNORIERT	The drainage areas in excess are ignored.
(F) MAXIMALE ANZAHL VON VARIABLEN UEBERNAHMEN ... UEBERSCHRITTEN, DARUEBERHINAUSGEHENDE VARIABLE UEBERNAHMEN WERDEN IGNORIERT	The number of variable external loadings of ... is exceeded, the surplus of variable external loadings is ignored.
(F) MEHR ALS FUENFZIG KNOTEN AN DER GRENZE DES HAUPTNETZES UNZULAESSIG	More than fifty nodes at the boundary of the calculation area are not permitted.
(F) MEHR ALS ... KLAERWERKSBECKEN	More than ... treatment basins are defined.
(F) MEHR ALS ... ZUGELASSENE SPEZIELLE IW-KONZENTRATIONEN ANGEGEBEN	There are more than ... special industrial wastewater concentrations specified.
(F) MEHR ALS ZWANZIG JAHRE EINGEGEBEN	More than twenty years are provided.
(F) ... MONAT FEHLT IN .. MESSREIHE	... month is missing in precipitation record .. .
(F) MONAT ... IM JAHR .... MESSREIHE .. BEREITS VORHANDEN	The month ... in the year .... of the precipitation record .. is already existing.
(F) MONAT ..., TAG .. Q = ... KLEINER ALS QMIN ODER GROESSER ALS QMAX	Month ..., day .., Q = ... is smaller than QMIN or larger than QMAX.
(F) MONATE SIND NICHT IN AUFSTEIGENDER REIHENFOLGE, JAHR ...., MESSREIHE ... KARTE NUMMER ..	The months are not in an increasing sequence for the year .... precipitation record ... card number .. .
(F) MONATSKARTE: MONATE SIND NICHT IN HOCHSTEIGENDER REIHENFOLGE ANGEGEBEN	Month card: the months are not given in increasing numbers.

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(F) MONATSKARTE: UNZULAESSIGE MONATSNUMMER GROESSER ALS ZWOELF	Month card: the number is not permitted, the number is larger than 12.
(F) PROGNOSEFAKTOR INDUSTRIEWASSER = ...	Prognosis factor for industrial water consumption of ... is out of range.
(F) PROGNOSEFAKTOR SCHMUTZSTOFF .. = ...	Prognosis factor for DWF pollution (pollutant number ..) = ... and is out of range.
(F) PROGNOSEFAKTOR WASSERVERBRAUCH = ...	Prognosis factor for water consumption of ... is out of range.
(F) QMIN ODER QMAX IST FALSCH	QMIN or QMAX is wrong.
(F) RECHENBEGINN IM JAHR ..., FUER DIESES JAHR SIND KEINE WERTE VORHANDEN	The calculation starts in the year ..., for this year no values are supplied.
(F) RECHENENDE IM JAHR ..., FUER DIESES JAHR SIND KEINE WERTE VORHANDEN	The simulation ends in the year ..., for this year no data are supplied.
(F) REGENDAUEREINFLUSS FORMATFEHLER IN DER ... KARTE	There is a format error in the card defining the rainfall duration influence.
(F) REGENINTERVALL = ... MINUTEN ENTSPRICHT NICHT DEM RECHENINTERVALL = .. MINUTEN	The rainfall interval of ... minutes does not correspond with the calculation interval of .. minutes.
(F) ROHRELEMENT-KARTEN FEHLEN	Sewer segment cards are missing.
(F) .... ROHRELEMENT-KARTEN WURDEN EINGELESEN, ... SIND NUR ZULAESSIG	A number of .... sewer segment cards were provided, only ... are possible.
(F) ROHR KA = .. KE = ...	The sewer segment with the upper node .... and the lower node .... must be checked.
(F) ROHR KA = ... KE = ... 2 ELEMENTKARTEN VORHANDEN	For the sewer segment with the upper node ... and the lower node .... 2 element cards are provided.

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(F) ROHR KA = ... KE = ... FORMATFEHLER IN DER ELEMENTKARTE (LFN ..)	In the element card with the sequential number .... concerning the sewer segment with the upper node ... and the lower node .... an format error is encountered.
(F) ROHR KA = ... KE = ... HAT KEIN POSITIVES GEFAELLE	The sewer segment with the upper node ... and the lower node .... has an inverse slope.
(F) ROHR KA = ... KE = ... PKZ = ... PROFILKARTE FEHLT	For the sewer segment with the upper node ... and the lower node .... and the cross section code ... the cross section card is missing.
(F) ROHR KA = ... KE = ... PROFILBREITE = ...	The width of the profile of ... for the sewer segment with the upper node ... and the lower node .... is wrong.
(F) ROHR KA = ... KE = ... PROFILKENNZAHL FEHLT	The cross section code for the sewer segment with the upper node ... and the lower node .... is missing.
(F) ROHR KA = ... KE = ... VORFLUTERKENNUNG = ...	The sewer segment with the upper node ... and the lower node .... belongs to the receiving water system .. .
(F) ROHR KA = ... KE = ... ZU = .. ES GIBT KEIN ROHR MIT KA = ... UND KE = ...	There is no sewer segment with the upper node ... and the lower node ...., which has an ingoing segment from .. (ZU).
(F) ROHR KA = ... KE = ... ZU1 = ... ZU2 = ... ZU3 ...	Check the ingoing segments ZU1 = ..., ZU2 = ..., ZU3 = ... for the sewer segment with the upper node ... and the lower node .... .
(F) SCHMUTZSTOFF = ... BEZEICHNUNG FEHLT	Pollutant ..., name is missing.
(F) SCHMUTZSTOFF .. DIE EINHEITSGANGLINIEN UMFASSEN .... KARTEN, ... SIND NUR ZULAESSIG	Pollutant .., the unit pollutographs contain .... cards, ... only are allowed.
(F) SCHMUTZSTOFF ... ERSTE KARTE FALSCH GEKENNZEICHNET	Pollutant ..., the first card is identified wrong.

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(F) SCHMUTZSTOFF .. FORMATFEHLER IN DER ... KARTE	Pollutant .., there is a format error in the ... card.
(F) SONDERBAUWERKSKARTEN USW. FEHLEN	Cards for special structures are missing.
(F) STRASSENREINIGUNGSKARTE FALSCH GEKENNZEICHNET	The card containing street cleaning values is identified wrong.
(F) TAGE SIND NICHT IN AUFSTEIGENDER REIHENFOLGE; MONAT ..., JAHR ...., PRECIPITATION SERIE .. KARTE NUMMER ...	Days are not in an increasing sequence, month ..., year ...., precipitation record .. card number .. .
(F) TAGESZEITEINFLUSS FORMATFEHLER IN DER ... KARTE	Diurnal variation influence there is a format error in the ... card.
(F) TEILEINZUGSGEBIET ... GEBIETSART .. IST NICHT AUF DEM QUANTITAETSFILE ANGEGEBEN	The drainage area ... area type .., is not specified in the quantity file.
(F) TEMPERATURKARTEN FEHLEN FUER DAS JAHR ...	For the year ... the temperature cards are missing.
(F) TITELKARTEN STIMMEN NICHT UEBEREIN	The title cards do not match.
(F) UEBERNAHMEKNOTEN (KONSTANT) DER .... UND DER ... KNOTEN SIND GLEICH	The boundary nodes with constant external loadings .... and ... are similar
(F) UEBERNAHMEKNOTEN (VARIABEL) DER .... UND DER ... SIND GLEICH	The boundary nodes with variable external loadings .... and ... are similar.
(F) VORFL = .. IN DER ... KARTE ENTSPRICHT NICHT DER TITELKARTE	Receiving water .. in the ... card does not match with the title card.
(F) VORFLUTERABFLUSSDATEN FEHLEN	Flow data of the receiving waters are missing.
(F) VORFLUTERTITELKARTE VORFL = ... IST NICHT ZULAESSIG	The receiving water title card of receiving water number ... is not permissible.
(F) WERT NICHT AUFSTEIGEND	The value is not in an increasing sequence.

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(4-76)

TYPING GUIDE SHEET
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OUTPUT HEADINGS OF THE PROGRAM DTCHCK

(in sequence as appearing in the listing)

GERMAN	ENGLISH
MULDENKAPAZITAETEN	Depression losses
MULTENINITIALWERTE	Initialization values for depression losses
VERSICKERUNGSRATEN	Infiltration rates
VERDUNSTUNGSRATEN	Evaporation rates
TEMPERATUREN	Temperatures
EINHEITSGANGLINIEN	Unit hydrographs
TW-ABFLUESSE	Dry-weather flows (DWF)
AUFBAUZEITEN	Build-up times
STRASSENREINIGUNG	Street cleaning
SCHMUTZSTOFF	Pollutant
GEBIETSFAKTOREN	Drainage area factors
REGENDAUER	Rainfall duration
TAGESZEITEINFLUSS	Diurnal variation influence
JAHRESZEITEINFLUSS	Annual variation influence
BECKENKLAERWIRKUNG	Retention efficiency
TW-SCHMUTZMENGEN	Dry-weather flow pollution
IW-KONZENTRATION	Industrial wastewater concentration
DATENPRUEFUNG	Data check
DIE MIT (F) GEKENNZEICHNETEN MITTEILUNGEN VERHINDERN DIE AUSFUEHRUNG DES BERECHNUNGSTEILS	All messages starting with (F) refer to an error and prevent a runoff simulation. The errors must be corrected.
ALLE ANDEREN SIND NUR INFORMATIV	All other messages are informative or serve as headings.
FILE NETZDATEN	Network data file

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GERMAN	ENGLISH
DIE EINGABE ERFOLGT IN METRISCHEN EINHEITEN	The input is in metric units.
EINGABE DER KANALNETZDATEN	Input of network data
VORLAUFKARTEN	First cards
PROGNOSEFAKTOREN	Prognosis factors
ANFANGSZEITPUNKT	Starting time
ENDZEITPUNKT	End time
UHR	Hour
MINUTEN	Minutes
LASTFALL	Condition (single event or continuous simulation)
EINZELEREIGNIS	Single event simulation
REGENINTENSITAETEN WERDEN EINGELESEN	Precipitation intensities are read in
AUSGABEROHRE	Printout segments
AUSGABEKNOTEN	Printout nodes
RUE	Overflow structure
RHB	(Retention) basin
INTERESSANTE KNOTEN	Nodes of interest
KNOTEN MIT KONSTANTER UEBERNAHME	Node with contant external loading
KNOTEN MIT VARIABLER UEBERNAHME	Node with variable external loading
RECHENDAUER	Simulation period
REGENDAUER	Rainfall duration
REGENINTENSITAETEN	Precipitation intensities
REIHE	Reinfall record
ROHRELEMENTKARTEN	Sewer segment cards
ROHR	Segment
PROFILHOEHE	Profile height
ANZAHL DER ROHRELEMENTE	Number of sewer segments
ANZAHL DER KNOTEN	Number of nodes
ROHRELEMENTKARTEN	Sewer segment cards
KNOTENLOGIK	Logic of the nodal system
BEARBEITUNGSREIHENFOLGE	Sequence of computation

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GERMAN	ENGLISH
NACH UMSPEICHERUNG	After ordering
SONDERBAUWERKE	Special structures
FASSUNGSVERMOEGEN DER RHB	Volume of basins
STEUERBARE ELEMENTE	Control gates
ELEMENTANZAHLEN	Number of elements
ROHRE	Segments
KNOTEN	Nodes
UEBERLAEUFE	Overflow structures
BECKEN	Basins
ROHRVERZWEIGUNGEN	Branching points
TEILEINZUGSGEBIETSKARTEN	Drainage area data
GEBIET	Drainage area
GEBIETSART	Drainage area type
FLAECHENANZAHL	Number of areas
FLAECHE	Area
BEFESTIGT	Impervious
BEFESTIGUNGSGRAD	Ratio of imperviousness
EINOHNER	Inhabitants
KNOTENUEBERSICHT	Summary of nodes
FILE QUANTITAET	Quantity file
PROFILKARTEN	Cross section cards
GESAMTLAENGE DER KANAELE	Total length of sewer segments
FASSUNGSVERMOEGEN DER KANAELE	Volume of sewer segments
ROHRUEBERSICHT	Summary of segments
TEILFUELLUNGSKURVEN FUER BECKEN	Partial filling curves for basins (this message should be ignored)
GEBIETSBEZEICHNUNGEN	Area type designations
GEBIETSARTEN	Drainage area types
MULDENKAPAZITAETEN	Depression losses
VERSICKERUNGSRATEN	Infiltration rates
VERDUNSTUNGSRATEN	Evaporation rates
MONATSTEMPERATUREN	Monthly temperatures

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GERMAN	ENGLISH
TEMPERATUREN FUER DIE EINZELEREIGNISRECHNUNG	Temperatures for the single event simulation
MESSZEITPUNKTE	Time of day where the minimum and maximum temperatures are applied
TAGESINTERVALL	Interval in the day
MONATSMITTELTEMPERATUREN	Average monthly temperatures
EINHEITSGANGLINIE	Unit hydrographs
TW-ABFLUESSE	Dry-weather flows (DWF)
ORIGINAL	Original
MIT WVBF = ...	Including the water consumption factor of ...
KONSTANTE UEBERNAHMEN	Constant external loadings
VARIABLE UEBERNAHMEN	Variable external loadings
FILE QUALITAET	Quality file
SCHMUTZSTOFFBEZEICHNUNGEN	Name of pollutants
SCHMUTZSTOFFE	Pollutants
SCHMUTZSTOFFAKTOREN	Pollutant factors
SCHMUTZMENGEN	Pollutant loads
AUFBAUZEIT	Pollutant built-up time
TURNUS DER STRASSENREINIGUNG	Interval of street cleaning
LETZTE STRASSENREINIGUNG VOR ... STUNDEN	Last street cleaning ... hours ago
EINFLUSSFAKTOREN	Coefficients
GEBIETSFAKTOREN	Area coefficients
REGENDAUEREINFLUSS	Rainfall duration influence
TAGESZEITEINFLUSS	Diurnal variation influence
JAHRESZEITEINFLUSS	Seasonal variation influence
BECKENKLAERWIRKUNG	Retention efficiency of basins
BECKEN IM NETZ	Retention basins
KLAERWERKSBECKEN	Treatment basins
TW-SCHMUTZMENGEN	Dry-weather flow pollution
TW-SCHMUTZ	Dry-weather flow pollution

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OUTPUT HEADINGS OF THE PROGRAM DTCHCK

(in alphabetical sequence)

GERMAN	ENGLISH
ALLE ANDEREN SIND NUR INFORMATIV	All other messages are informative or serve as headings
ANFANGSZEITPUNKT	Starting time
ANZAHL DER KNOTEN	Number of nodes
ANZAHL DER ROHRELEMENTE	Number of segments
AUFBAUZEIT	Pollutant built-up time
AUSGABEKNOTEN	Printout node
AUSGABEROHRE	Printout segments
BEARBEITUNGSREIHENFOLGE	Sequence of computation
BECKEN	Basins
BECKEN IM NETZ	Retention basins
BECKENKLAERWIRKUNG	Retention efficiency of basins
BEFESTIGT	Impervious
BEFESTIGUNGSGRAD	Ratio of imperviousness
DATENPRUEFUNG	Data check
DIE EINGABE ERFOLGT IN METRISCHEN EINHEITEN	The input is in metric units
DIE MIT (F) GEKENNZEICHNETEN MITTEILUNGEN VERHINDERN DIE AUSFUEHRUNG DES BERECHNUNGSTEILS	All messages starting with (F) refer to an error and prevent a runoff simulation. The errors must be corrected
EINFLUSSFAKTOREN	Coefficients
EINGABE DER KANALNETZDATEN	Input of network data
EINHEITSGANGLINIE	Unit hydrographs
EINWOHNER	Inhabitants
EINZELEREIGNIS	Single event simulation
ELEMENTANZAHLEN	Number of elements

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GERMAN	ENGLISH
ENDZEITPUNKT	End time
FASSUNGSVERMOEGEN DER KANAELE	Volume of sewer segments
FASSUNGSVERMOEGEN DER RHB	Volume of basins
FILE NETZDATEN	Network data file
FILE QUALITAET	Quality file
FILE QUANTITAET	Quantity file
FLAECHE	Area
FLAECHENANZAHL	Number of areas
GEBIET	Drainage area
GEBIETSART	Drainage area type
GEBIETSARTEN	Drainage area types
GEBIETSBEZEICHNUNGEN	Area type designations
GEBIETSFAKTOREN	Area coefficients
GESAMTLAENGE DER KANAELE	Total length of sewer segments
INTERESSANTE KNOTEN	Nodes of interest
IW-KONZENTRATION	Industrial wastewater concentration
JAHRESZEITENEINFLUSS	Seasonal variation influence
KARTE	Card
KLAERWERKSBECKEN	Treatment basins
KNOTEN	Nodes
KNOTENLOGIK	Logic of the nodal system
KNOTEN MIT KONSTANTER UEBERNAHME	Node with constant external loading
KNOTEN MIT VARIABLER UEBERNAHME	Node with variable external loading
KNOTENUEBERSICHT	Summary of nodes
KONSTANTE UEBERNAHMEN	Constant external loadings
LASTFALL	Condition (single event or continuous simulation)
LETZTE STRASSENREINIGUNG VOR ... STUNDEN	Last street cleaning ... hours ago
MESSZEITPUNKTE	Time of day where the minimum and maximum temperatures are applied

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GERMAN	ENGLISH
MINUTEN	Minutes
MIT WVBF = ...	Including the water consumption factor of ...
MONATSMITTELTEMPERATUREN	Average monthly temperatures
MONATSTEMPERATUREN	Monthly temperatures
MULDENINITIALWERTE	Initialisation values for depression losses
MULDENKAPAZITAETEN	Depression losses
NACH UMSPEICHERUNG	After ordering
ORIGINAL	Original
PROFILHOEHE	Profile height
PROFILKARTEN	Cross section cards
PROGNOSEFAKTOREN	Prognosis factors
RECHENDAUER	Simulation period
REGENDAUER	Rainfall duration
REGENDAUEREINFLUSS	Rainfall duration influence
REGENINTENSITAETEN	Precipitation intensities
REGENINTENSITAETEN WERDEN EINGELESEN	Precipitation intensities are read in
REIHE	Rainfall record
RHB	(Retention) basin
ROHRE	Segments
ROHRELEMENTKARTEN	Sewer segment cards
ROHRUEBERSICHT	Summary of segments
ROHRVERZWEIGUNGEN	Branching points
RUE	Overflow structure
SCHMUTZMENGEN	Pollutant loads
SCHMUTZSTOFFE	Pollutants
SCHMUTZSTOFFBEZEICHNUNGEN	Name of pollutants
SCHMUTZSTOFFAKTOREN	Pollutant factors
SONDERBAUWERKE	Special structures
STEUERBARE ELEMENTE	Control gates
STRASSENREINIGUNG	Street cleaning
TAGESINTERVALL	Interval in the day

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TYPING GUIDE SHEET

GERMAN	ENGLISH
TAGESZEITEINFLUSS	Diurnal variation influence
TEILEINZUGSGEBIETSKARTEN	Drainage area data
TEILFUELLUNGSKURVEN FUER BECKEN	Partial filling curves for basins (this message should be ignored)
TEMPERATUREN	Temperatures
TEMPERATUREN FUER DIE EINZELEREIGNISRECHNUNG	Temperatures for the single event simulation
TURNUS DER STRASSENREINIGUNG	Interval of street cleaning
TW-ABFLUESSE	Dry-weather flows (DWF)
TW-SCHMUTZ	Dry-weather flow pollution
TW-SCHMUTZMENGEN	Dry-weather flow pollution
UEBERLAEUFE	Overflow structures
UHR	Hour
VARIABLE UEBERNAHMEN	Variable external loadings
VERDUNSTUNGSRATEN	Evaporation rates
VERSICKERUNGSRATEN	Infiltration rates
VORLAUFKARTEN	First cards

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APPENDIX 4

DATA CARDS FOR STATCS

PROGRAM STATCS: Input data

DATA CARD	1 :	Language
DATA CARD	2 :	Listing of input data
DATA CARD	3 :	Units
DATA CARD	4 :	Special nodes of interest
DATA CARD	5 :	Overflow totals
DATA CARD	6 :	Listing of simulation results as arranged for statistical analysis
DATA CARD	7 :	Months
DATA CARD	8 :	Annual statistics
DATA CARD(S)	9 :	Pollutants
DATA CARD(S)	10 :	Nodes of interest and special nodes of interest analyzed
DATA CARD(S)	11 :	Graphical output
DATA CARD	12a:	Standard scales
DATA CARD(S)	12b:	Individual scales
DATA CARD(S)	13 :	One-dimensional analysis
DATA CARD(S)	14 :	Two-dimensional analysis
DATA CARD	15 :	End card

NOTE: PROGRAM STATCS allows for statistical analysis of continuous simulation results (not of precipitation data).

R and S at the upper right of each data card description specifies if the data card(s) must be included for separate and combined sewer system (S) and/or for receiving water system (R) simulations.

A Fortran F-format (real numbers) is required, if a decimal point is shown in the space under consideration. The location of the decimal point as indicated is not binding and may be adjusted to fit the number into the space available. However, all real numbers must be provided including their decimal points. A Fortran I-format (integer numbers) is requested, if no decimal point is shown in the space under consideration. All integer numbers must be right adjusted within the space provided.

Symbols contained in the format box, but not individually explained, must be punched as shown.

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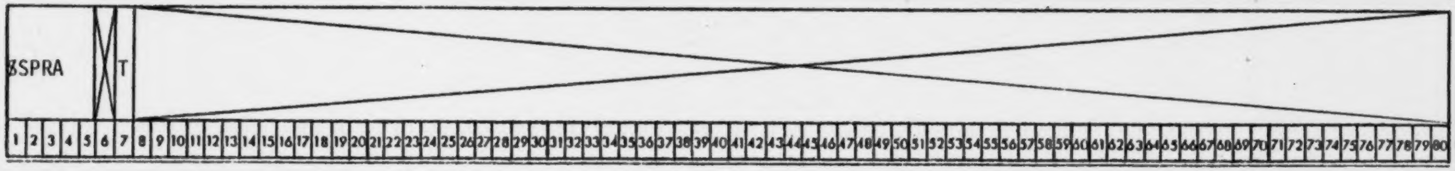
R
S


$SPRA
T
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card determines the language of the output headings

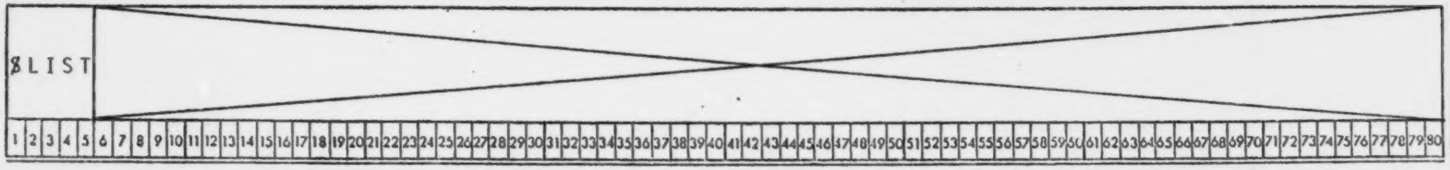
T 1 for german headings
2 for english headings

NOTE: The following data cards may be in arbitrary order except $END always concludes the data card set. Do not replace data cards not required by empty cards.

TYPING GUIDE SHEET

PROGRAM STATCS **DATA CARD 2:** Listing of input data

R
S


b̸LIST
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: If this card is included, the following input cards are listed in front of the statistics output.

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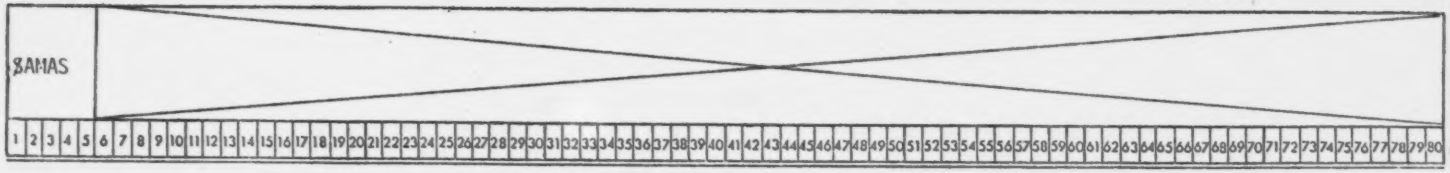
TYPING GUIDE SHEET

PROGRAM STATCS

DATA CARD 3: Units

R
S


$AMAS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: If this card is included the statistics output is provided in english units.

NOTE: If included also the scales must enter in english units. If this card is not provided, then the scales must be given in metric units.

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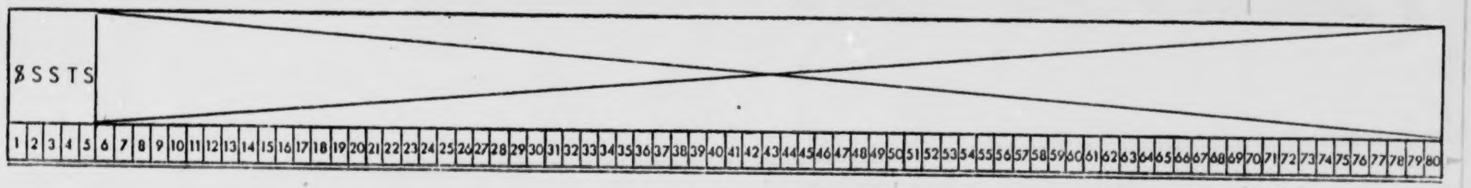
PROGRAM STATCS

DATA CARD 4: Special nodes of interest

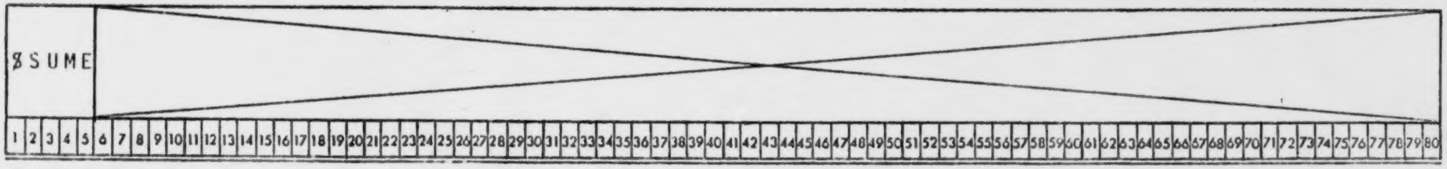

$SSTS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card calls for the statistical analysis of continuous simulation results at the special nodes of interest specified on DATA CARD 3g of PROGRAM DTCHCK: Network data in Appendix 2

NOTE: This card is not allowed in case of statistical analysis of continuous simulation results at the nodes of interest given on DATA CARD 3h of PROGRAM DTCHCK: Network data in Appendix 2.

TYPING GUIDE SHEET

PROGRAM STATCS **DATA CARD 5: Overflow totals** **S**


$SUME
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: Inserting this card the monthly and annual amount of overflow for each overflow structure analyzed is printed out.

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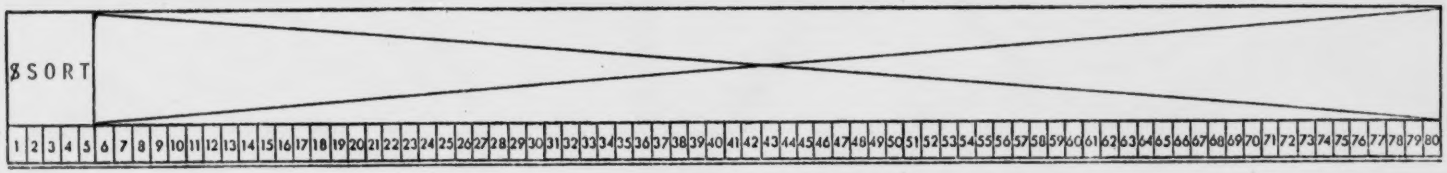
TYPING GUIDE SHEET

PROGRAM STATCS

DATA CARD 6: Listing of simulation results as arranged for statistical analysis

R
S


b̸SORT
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: If this card is included a complete listing of the simulation data as arranged for statistical analysis is provided.

NOTE: Do not include this card normally. Extensive output.

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DATA CARD 7: Months

R
S

&MON	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME
1 2 3 4	5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80											

EXPLANATIONS: This card defines the names of the months considered.

NAME The individual names of the months simulated only may be given (maximum of 12). The sequence must correspond to the sequence of simulation. Between each name given there must be at least one blank.

Default names: JANUARY FEBRUARY MARCH ...

NOTE: For german language (T = 1 on DATA CARD 1 of PROGRAM STATCS), the german words for the months must be used.

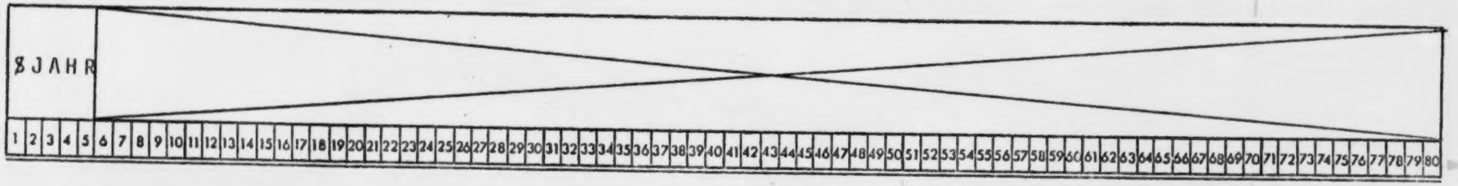
Default names: JANUAR FEBRUAR MAERZ ...

TYPING GUIDE SHEET

PROGRAM STATCS

DATA CARD 8: Annual statistics

R
S


8JAHR
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: If this card is included, only annual statistics are printed.

NOTE: If this card is not provided in addition to annual statistics the monthly statistics are printed.

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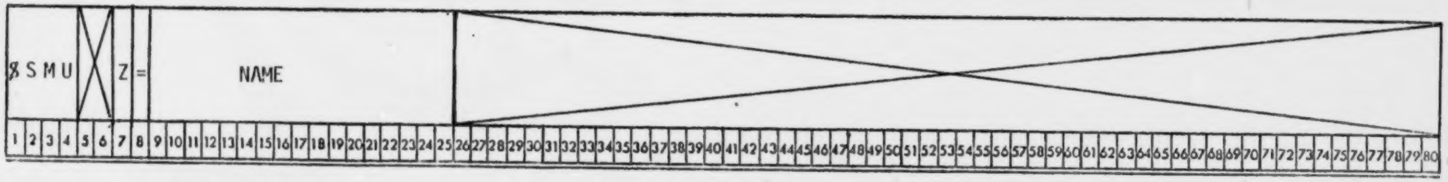
TYPING GUIDE SHEET

PROGRAM STATCS

DATA CARD(S) 9: Pollutants

R
S


$SMU
Z=
NAME
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card coordinates the pollutant results with the correct names for the output headings.

Z	Number of pollutant such as 1 or 2 or 3 or 4
NAME	Name of pollutant corresponding to Z, e.g. BOD5, TSS, SS or FECAL COLI

NOTE: For each pollutant an individual card must be provided. There is a maximum of 4 pollutants, e.g. 4 data cards in sequential order.

$SMU only must be contained on the first card.

Names and numbers must be identical to the information given on DATA CARD 2 of PROGRAM DTCHCK: Quality data in Appendix 2.

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TYPING GUIDE SHEET

DATA CARD(S) 10: Nodes of interest or special nodes of interest analysed

R
S

$WAHL	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME
1 2 3 4 5	6 7 8 9 10	11 12 13 14 15	16 17 18 19 20	21 22 23 24 25	26 27 28 29 30	31 32 33 34 35	36 37 38 39 40	41 42 43 44 45	46 47 48 49 50	51 52 53 54 55	56 57 58 59 60	61 62 63 64 65	66 67 68 69 70	71 72 73 74 75	76 77 78 79 80

EXPLANATIONS: Defines the nodes of interest (overflows, basins or receiving water system nodes) or the special nodes of interest respectively at which statistical analysis of continuous simulation results is performed.

NAME Names of the nodes of interest or special nodes of interest respectively. At a maximum 50 nodes can be given, minimum one. See also DATA CARDS 3g and 3h of PROGRAM DTCHCK: Network data in Appendix 2

NOTE: The nodes specified should be of the same type for one run. The different types are:

Statistics type 2: basins
Statistics type 3: overflow structures
Statistics type 4: receiving water system nodes
or special nodes of interest

If this card is missing statistical analysis is done for all nodes, to which on DATA CARDS 13 and 14 of PROGRAM STATCS statistical properties are coordinated. If statistical analysis is requested for more than 15 nodes the sequence cards do not contain $WAHL.

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PROGRAM STATCS DATA CARD(S) 11: Graphical output

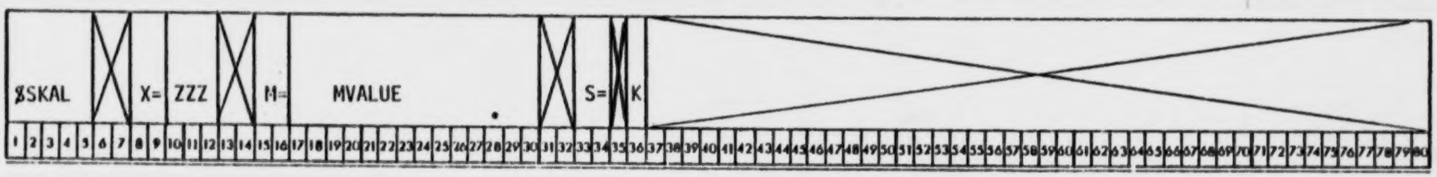
R
S

$GRAF	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME	NAME
1 2 3 4 5	6 7 8 9 10	11 12 13 14 15	16 17 18 19 20	21 22 23 24 25	26 27 28 29 30	31 32 33 34 35	36 37 38 39 40	41 42 43 44 45	46 47 48 49 50	51 52 53 54 55	56 57 58 59 60	61 62 63 64 65	66 67 68 69 70	71 72 73 74 75	76 77 78 79 80

EXPLANATIONS: For the nodes specified the statistical results are plotted on the line printer.

NAME Names of interesting nodes or special nodes of interest. As a maximum 50 nodes may be given.

NOTE: In case of more than 15 nodes the sequence cards do not contain $GRAF. In one statistics run only nodes of the same should be given (similar to DATA CARD(S) 10 of PROGRAM STATCS).


$SKAL
X=
ZZZ
M=
MVALUE
S=
K
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card defines the scales for the statistical properties.

ZZZ	Number of statistical property. A list of statistical properties available is contained in Appendix 5, Properties for Statistical Analysis.	
MVALUE	Maximum value of scale	
K	1	linear scale (one scale range is 1/11 of MVALUE)
	2	geometrical scale (scales are in % of MVALUE: 10.0/12.5/16.0/20.0/25.0/31.5/40.0/50.0/63.0/80.0/100.0)
	3	logarithmic scale (scales are in % of MVALUE: 10.0/17.6/27.7/30.1/60.2/69.9/77.8/84.5/90.3/95.4/100.0)
	4	free choice of scale (the individual figures must be given on the subsequent DATA CARD 12b of PROGRAM STATCS)

NOTE: For each statistical property to be analysed this card must be provided. Sequence cards do not contain $SKAL. Scales must be defined for all NNN and/or NN1 and NN2 given on DATA CARD(S) 13 and/or 14 of PROGRAM STATCS.

As the maximum scale value is not chosen automatically it is suggested to estimate MVALUE according to single event simulation results for a one year recurrence storm and add 20 %. Sometimes it is advisable to perform individual statistics runs with different scales for each node. For final statistics runs the scales should be chosen that the maximum value is exceeded less than once a year.

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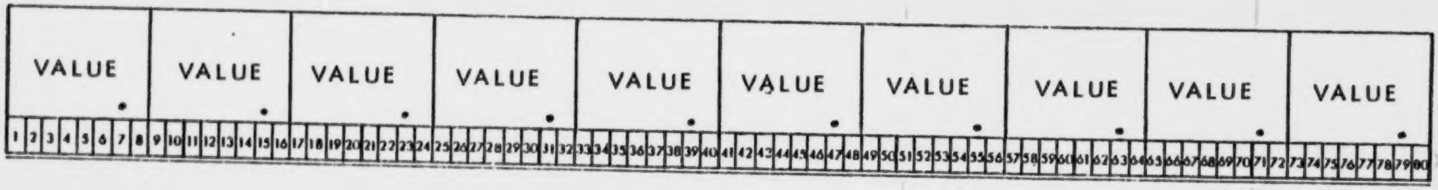
DATA CARD 12b: Individual scales

R
S


VALUE
VALUE
VALUE
VALUE
VALUE
VALUE
VALUE
VALUE
VALUE
VALUE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: If K = 4 on DATA CARD 12a of PROGRAM STATCS, on this card the individual scale values are provided.

VALUE Individual scale values. The decimal point must be provided with each value. VALUE < MVALUE on DATA CARD(S) 12a of PROGRAM STATCS

NOTE: This card only is contained in case of K = 4 on DATA CARD(S) 12a of PROGRAM STATCS.

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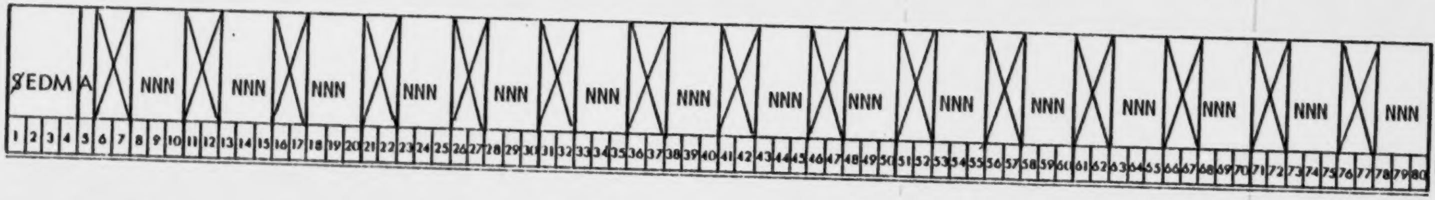
DATA CARD(S) 13: One-dimensional analysis


$EDMA
NNN
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: Here the statistical properties subject to one-dimensional statistical analysis are defined.

A	Statistics type 2, 3 or 4 (see DATA CARD(S) 10 of PROGRAM STATCS)
NNN	Numbers of statistical properties. A list of statistical properties is given in Appendix 5, Properties for Statistical Analysis

NOTE: Continuation cards do not contain $EDMA. If different node types are to be analysed in one run also different $EDM cards with different A's each including the necessary sequence cards must be provided.

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S

DATA CARD(S) 14: Two-dimensional analysis

$ZDM	A	☒	P=	NN1	,	NN2	☒	E=	B .	B .	B .	☒	H=	C .	C .	C .	☒
1 2 3 4	5	6 7	8 9	10 11 12	13	14 15 16	17 18	19 20	21 22 23 24 25	26 27 28 29 30	31 32 33 34 35	36 37	38 39	40 41 42 43 44	45 46 47 48 49	50 51 52 53 54	55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

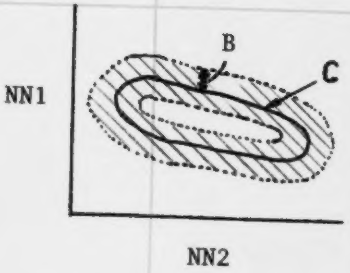
EXPLANATIONS: Here the statistical properties subject to two-dimensional statistical analysis are defined.

A — Statistical type 2, 3 or 4 (see DATA CARD(S) 10 of PROGRAM STATCS)

NN1, NN2 — Pair of statistical properties. A list of statistical properties is given in Appendix 5. For each pair of statistical properties one card has to be specified

B — Three ranges (±) for C which are considered to represent a isofrequency curve, e.g.
B = 0.2 0.5 2.0

C — Three frequencies, which are plotted on request of DATA CARD(S) 9 of PROGRAM STATCS,
e.g. C = .5 2.0 10.0



NOTE: Per statistics type, 8 pairs of statistical properties can be given at a maximum.

Continuation cards do not contain $ZDMA. If different node types are to be analysed in one run also different $ZDM cards with different A's each including the necessary sequence cards must be provided.

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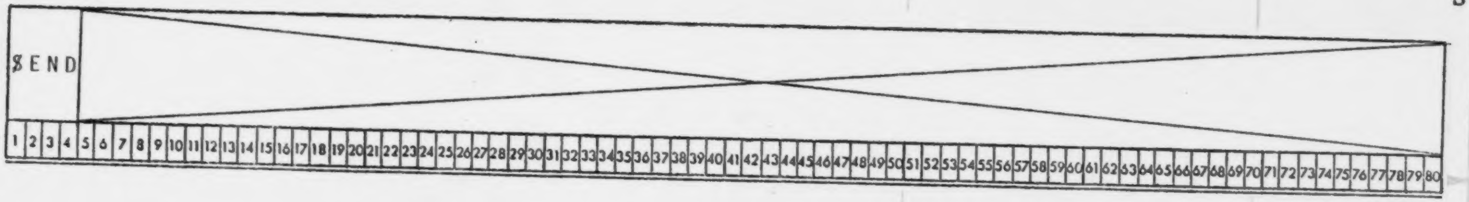
PROGRAM STATCS

DATA CARD 15: End card

R
S


$END
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

EXPLANATIONS: This card yields the end of the statistics data card set.

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APPENDIX 5

PROPERTIES FOR STATISTICAL ANALYSIS

PROPERTIES FOR STATISTICAL ANALYSIS OF PRECIPITATION DATA

No.	Property	Dimensions Metric Units
1	Rainfall duration per event	min
2	Dry spell between rainfall events	min
3	Total rainfall depth per event	mm
4	Average rainfall intensity per event	$\frac{1}{1,000}\quad\frac{\text{mm}}{5\text{ min}}$
5	Maximum rainfall intensity per event	$\frac{1}{1,000}\quad\frac{\text{mm}}{5\text{ min}}$
6	Ratio of average to maximum intensity per event	-
7	Time elapsed from the start of an event to the interval with the maximum rainfall intensity of the same event	min
8	Ratio of time elapsed to the interval with the maximum intensity to total rainfall duration of this event	-
9	Rainfall depth accumulated from the start of an event till the interval with maximum rainfall intensity of the same event	mm
10	Ratio of rainfall depth accumulated until the interval with maximum intensity to total rainfall depth of this event	-
11	Individual rainfall intensities of five minute intervals	$\frac{1}{1,000}\quad\frac{\text{mm}}{5\text{ min}}$

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PROPERTIES FOR STATISTICAL ANALYSIS OF BASIN RESULTS

(Statistics Type 2)

No.	Property	Dimensions Metric Units	 English Units
1	Duration of surcharge	min	min
2	Duration between surcharge conditions	min	min
3	Q-inflow rate interval values	m^3/s	cfs
4	Q-inflow total	m^3	cu.ft.
5	Q-inflow rate average	m^3/s	cfs
6	Q-inflow rate maximum	m^3/s	cfs
11	P1-inflow rate interval values	kg/s	lbs/s
12	P1-inflow total	kg	lbs
13	P1-inflow rate average	kg/s	lbs/s
14	P1-inflow rate maximum	kg/s	lbs/s
15	P2-inflow rate interval values	kg/s	lbs/s
16	P2-inflow total	kg	lbs
17	P2-inflow rate average	kg/s	lbs/s
18	P2-inflow rate maximum	kg/s	lbs/s
19	P3-inflow rate interval values	kg/s	lbs/s
20	P3-inflow total	kg	lbs
21	P3-inflow rate average	kg/s	lbs/s
22	P3-inflow rate maximum	kg/s	lbs/s
23	P4-inflow rate interval values	kg/s	lbs/s
24	P4-inflow total	kg	lbs
25	P4-inflow rate average	kg/s	lbs/s
26	P4-inflow rate maximum	kg/s	lbs/s
43	P1-outflow total	kg	lbs
44	P1-retention average	%	%

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No.	Property	Dimensions Metric Units	 English Units
45	P1-retention maximum	%	%
47	P2-outflow total	kg	lbs
48	P2-retention average	%	%
49	P2-retention maximum	%	%
51	P3-outflow total	kg	lbs/s
52	P3-retention average	%	%
53	P3-retention maximum	%	%
55	P4-outflow total	kg	lbs
56	P4-retention average	%	%
57	P4-retention maximum	%	%
67	P1-inflow concentration average	mg/l	ppm
68	P1-inflow concentration maximum	mg/l	ppm
69	P2-inflow concentration average	mg/l	ppm
70	P2-inflow concentration maximum	mg/l	ppm
71	P3-inflow concentration average	mg/l	ppm
72	P3-inflow concentration maximum	mg/l	ppm
73	P4-inflow concentration average	mg/l	ppm
74	P4-inflow concentration maximum	mg/l	ppm
75	P1-outflow rate interval values	kg/s	lbs/s
76	P1-outflow rate average	kg/s	lbs/s
77	P1-outflow rate maximum	kg/s	lbs/s
78	P2-outflow rate interval values	kg/s	lbs/s
79	P2-outflow rate average	kg/s	lbs/s
80	P2-outflow rate maximum	kg/s	lbs/s
81	P3-outflow rate interval values	kg/s	lbs/s
82	P3-outflow rate average	kg/s	lbs/s
83	P3-outflow rate maximum	kg/s	lbs/s
84	P4-outflow rate interval values	kg/s	lbs/s
85	P4-outflow rate average	kg/s	lbs/s
86	P4-outflow rate maximum	kg/s	lbs/s
87	P1-outflow concentration average	mg/l	ppm

No.	Property	Dimensions	
		Metric Units	English Units
88	P1-outflow concentration maximum	mg/l	ppm
89	P2-outflow concentration average	mg/l	ppm
90	P2-outflow concentration maximum	mg/l	ppm
91	P3-outflow concentration average	mg/l	ppm
92	P3-outflow concentration maximum	mg/l	ppm
93	P4-outflow concentration average	mg/l	ppm
94	P4-outflow concentration maximum	mg/l	ppm

PROPERTIES FOR STATISTICAL ANALYSIS OF OUTFALL AND OVERFLOW STRUCTURE RESULTS

(Statistics Type 3)

No.	Property	Dimensions Metric Units	 English Units
1	Duration of overflow	min	min
2	Duration between overflow events	min	min
3	Q-inflow rate interval values	m^3/s	cfs
4	Q-inflow total	m^3	cu.ft.
5	Q-inflow rate average	m^3/s	cfs
6	Q-inflow rate maximum	m^3/s	cfs
7	Q-overflow rate interval values	m^3/s	cfs
8	Q-overflow total	m^3	cu.ft.
9	Q-overflow rate average	m^3/s	cfs
10	O-overflow rate maximum	m^3/s	cfs
12	P1-inflow total	kg	lbs
13	P1-inflow rate average	kg/s	lbs/s
14	P1-inflow rate maximum	kg/s	lbs/s
16	P2-inflow total	kg	lbs
17	P2-inflow rate average	kg/s	lbs/s
18	P2-inflow rate maximum	kg/s	lbs/s
20	P3-inflow total	kg	lbs
21	P3-inflow rate average	kg/s	lbs/s
22	P3-inflow rate maximum	kg/s	lbs/s
24	P4-inflow total	kg	lbs
25	P4-inflow rate average	kg/s	lbs/s
26	P4-inflow rate maximum	kg/s	lbs/s
27	P1-overflow rate interval value	kg/s	lbs/s

No.	Property	Dimensions Metric Units	 English Units
28	P1-overflow total	kg	lbs
29	P1-overflow rate average	kg/s	lbs/s
30	P1-overflow rate maximum	kg/s	lbs/s
31	P2-overflow rate interval value	kg/s	lbs/s
32	P2-overflow total	kg	lbs
33	P2-overflow rate average	kg/s	lbs/s
34	P2-overflow rate maximum	kg/s	lbs/s
35	P3-overflow rate interval values	kg/s	lbs/s
36	P3-overflow total	kg	lbs
37	P3-overflow rate average	kg/s	lbs/s
38	P3-overflow rate maximum	kg/s	lbs/s
39	P4-overflow rate interval values	kg/s	lbs/s
40	P4-overflow total	kg	lbs
41	P4-overflow rate average	kg/s	lbs/s
42	P4-overflow rate maximum	kg/s	lbs/s
59	P1-overflow concentration average	mg/l	ppm
60	P1-overflow concentration maximum	mg/l	ppm
61	P2-overflow concentration average	mg/l	ppm
62	P2-overflow concentration maximum	mg/l	ppm
63	P3-overflow concentration average	mg/l	ppm
64	P3-overflow concentration maximum	mg/l	ppm
65	P4-overflow concentration average	mg/l	ppm
66	P4-overflow concentration maximum	mg/l	ppm

PROPERTIES FOR STATISTICAL ANALYSIS OF SPECIAL NODES OF INTEREST

(Statistics Type 4)

No.	Property	Dimensions Metric Units	 English Units
1	Duration of inflow	min	min
2	Duration between inflow events	min	min
3	Q-inflow rate interval values	m^3/s	cfs
4	Q-inflow total	m^3	cu.ft.
5	Q-inflow rate average	m^3/s	cfs
6	Q-inflow rate maximum	m^3/s	cfs
11	P1-inflow rate interval values	kg/s	lbs/s
12	P1-inflow total	kg	lbs
13	P1-inflow rate average	kg/s	lbs/s
14	P1-inflow rate maximum	kg/s	lbs/s
15	P2-inflow rate interval values	kg/s	lbs/s
16	P2-inflow total	kg	lbs
17	P2-inflow rate average	kg/s	lbs/s
18	P2-inflow rate maximum	kg/s	lbs/s
19	P3-inflow rate interval values	kg/s	lbs/s
20	P3-inflow total	kg	lbs
21	P3-inflow rate average	kg/s	lbs/s
22	P3-inflow rate maximum	kg/s	lbs/s
23	P4-inflow rate interval values	kg/s	lbs/s
24	P4-inflow total	kg	lbs
25	P4-inflow rate average	kg/s	lbs/s
26	P4-inflow rate maximum	kg/s	lbs/s
67	P1-inflow concentration average	mg/l	ppm

No.	Property	Dimensions Metric Units	 English Units
68	P1-inflow concentration maximum	mg/l	ppm
69	P2-inflow concentration average	mg/l	ppm
70	P2-inflow concentration maximum	mg/l	ppm
71	P3-inflow concentration average	mg/l	ppm
72	P3-inflow concentration maximum	mg/l	ppm
73	P4-inflow concentration average	mg/l	ppm
74	P4-inflow concentration maximum	mg/l	ppm
95	Q-inflow rate interval values above specified DWF ratio	m^3/s	cfs
96	Q-inflow total above specified DWF ratio	m^3	cu.ft.
97	Q-inflow rate average above specified DWF ratio	m^3/s	cfs
98	Q-inflow rate maximum above specified DWF ratio	m^3/s	cfs

PROPERTIES FOR STATISTICAL ANALYSIS OF RECEIVING WATER SYSTEM NODES

(Statistics Type 4)

No.	Property	Dimensions Metric Units	 English Units
1	Duration of runoff	min	min
2	Duration between runoff events	min	min
3	Q-inflow rate interval values	m^3/s	cfs
4	Q-inflow total	m^3	cu.ft.
5	Q-inflow rate average	m^3/s	cfs
6	Q-inflow rate maximum	m^3/s	cfs
11	P1-inflow rate interval values	kg/s	lbs/s
12	P1-inflow total	kg	lbs
13	P1-inflow rate average	kg/s	lbs/s
14	P1-inflow rate maximum	kg/s	lbs/s
15	P2-inflow rate interval values	kg/s	lbs/s
16	P2-inflow total	kg	lbs
17	P2-inflow rate average	kg/s	lbs/s
18	P2-inflow rate maximum	kg/s	lbs/s
19	P3-inflow rate interval values	kg/s	lbs/s
20	P3-inflow total	kg	lbs
21	P3-inflow rate average	kg/s	lbs/s
22	P3-inflow rate maximum	kg/s	lbs/s
23	P4-inflow rate interval values	kg/s	lbs/s
24	P4-inflow total	kg	lbs
25	P4-inflow rate average	kg/s	lbs/s
26	P4-inflow rate maximum	kg/s	lbs/s

No.	Property	Dimensions	
		Metric Units	English Units
46	P1-background concentration receiving waters maximum	mg/l	ppm
50	P2-background concentration receiving waters maximum	mg/l	ppm
54	P3-background concentration receiving waters maximum	mg/l	ppm
58	P4-background concentration receiving waters maximum	mg/l	ppm
67	P1-inflow concentration average	mg/l	ppm
68	P1-inflow concentration maximum	mg/l	ppm
69	P2-inflow concentration average	mg/l	ppm
70	P2-inflow concentration maximum	mg/l	ppm
71	P3-inflow concentration average	mg/l	ppm
72	P3-inflow concentration maximum	mg/l	ppm
73	P4-inflow concentration average	mg/l	ppm
74	P4-inflow concentration maximum	mg/l	ppm
95	Q-background flow rate receiving waters interval value	m^3/s	cfs
96	Q-background flow receiving waters total	m^3	cu.ft.
97	Q-background flow rate receiving waters average	m^3/s	cfs
98	Q-background flow rate receiving waters maximum	m^3/s	cfs
99	P1-background flow rate receiving waters interval value	kg/s	lbs/s
100	P1-background flow receiving waters total	kg	lbs
101	P1-background flow rate receiving waters average	kg/s	lbs/s
102	P1-background flow rate receiving waters maximum	kg/s	lbs/s
103	P2-background flow rate receiving waters interval values	kg/s	lbs/s

No.	Property	Dimensions Metric Units	 English Units
104	P2-background flow receiving waters total	kg	lbs
105	P2-background flow rate receiving waters average	kg/s	lbs/s
106	P2-background flow rate receiving waters maximum	kg/s	lbs/s
107	P3-background flow rate receiving waters interval values	kg/s	lbs/s
108	P3-background flow receiving waters total	kg	lbs
109	P3-background flow rate receiving waters average	kg/s	lbs/s
110	P3-background flow rate receiving waters average	kg/s	lbs/s
111	P4-background flow rate receiving waters interval values	kg/s	lbs/s
112	P4-background flow receiving waters total	kg	lbs
113	P4-background flow rate receiving waters average	kg/s	lbs/s
114	P4-background flow rate receiving waters maximum	kg/s	lbs/s
115	P1-background flow concentration receiving waters average	mg/l	ppm
116	P2-background flow concentration receiving waters average	mg/l	ppm
117	P3-background flow concentration receiving waters average	mg/l	ppm
118	P4-background flow concentration receiving waters average	mg/l	ppm

APPENDIX 6

TEST EXAMPLE FOR QQSEGL

INPUT DATA CARDS

```
         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
--------------------------------------------------------------------------------

10
15
    0    0  800 3200 2800  500  400  800  200  200  200  200  300  100  100
  8001000010000  923
1022
 0.18000 0.37000 0.23000 0.10000 0.06000 0.03500 0.02000 0.01000 0.00500 0.00200
 0.06400 0.11000 0.12000 0.11800 0.10900 0.09700 0.08200 0.06700 0.05300 0.04300
 0.03300 0.02600 0.02000 0.01600 0.01100 0.00900 0.00700 0.00500 0.00400 0.00300
 0.00200 0.00100
26.03000 0.10000
 0.00000 0.00000 0.00800 0.04500 0.14000 0.16500 0.11000 0.08000 0.06300 0.04800
 0.03600 0.02800 0.02400 0.02000 0.01600 0.01100 0.00700 0.00400 0.00200 0.00100
 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000
 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000
2
    1
810
 5000.00    1.00    1.00
    3.08    3.21    1.50    0.77    0.49    0.28    0.14    0.03
    3.83    5.36    2.63    1.54    1.01    0.68    0.45    0.26    0.15    0.07
 0.80000 0.80000 0.80000 0.80000 0.80000 0.80000 0.80000 0.80000 0.82000 0.84000
 0.86000 0.89000 0.92000 0.95000 1.00000 1.00000 1.00000 1.00000 0.99000 0.98000
 0.97000 0.98000 0.99000 1.00000 1.00000 1.00000 1.00000 1.00000 0.99000 0.98000
 0.97000 0.98000 0.99000 1.00000 1.00000 1.00000 1.00000 1.00000 0.98000 0.96000
 0.94000 0.92000 0.90000 0.88000 0.86000 0.84000 0.82000 0.80000
 0.80000 0.80000 0.80000 0.80000 0.80000 0.80000 0.80000 0.80000 0.82000 0.84000
 0.86000 0.89000 0.92000 0.95000 1.00000 1.00000 1.00000 1.00000 0.99000 0.98000
 0.97000 0.98000 0.99000 1.00000 1.00000 1.00000 1.00000 1.00000 0.99000 0.98000
 0.97000 0.98000 0.99000 1.00000 1.00000 1.00000 1.00000 1.00000 0.98000 0.96000
 0.94000 0.92000 0.90000 0.88000 0.86000 0.84000 0.82000 0.80000
 1.00000 1.00000 0.96000 0.87000 0.70000 0.55000 0.45000 0.38000 0.33000 0.29000
 0.27000 0.25000 0.23000 0.22000 0.21000 0.20000 0.20000 0.20000 0.20000 0.20000
 1.00000 1.00000 0.99000 0.98000 0.95000 0.88000 0.79000 0.66000 0.55000 0.45000
 0.39000 0.35000 0.32000 0.31000 0.31000 0.30000 0.30000 0.30000 0.30000 0.30000
    0.00    0.00    1.00    4.70    8.00    6.50    3.60    2.60    1.80    1.20
    0.80    0.60    0.40    0.30    0.20    0.10    0.00    0.00    0.00    0.00
    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
    0.00    0.00    1.00    5.90   12.00   11.00    7.60    5.80    4.60    3.50
    2.60    1.90    1.40    1.00    0.50    0.40    0.20    0.10    0.00    0.00
    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
   15.00   80.00
```

OUTPUT

```
                                                                DIRT TYPE 1                                            DIRT TYPE 2
INT   WQRA    WQGA    WQTOT    MSWQ      DLPHR  DLPHG ADLTOT   MSDQ     DDQ   CNTRN      DLPHR  DLPHG ADLTOT   MSDQ     DDQ   CNTRN

  1  0.0000  0.0000  0.0000  0.0000      0.000  0.000  0.000  0.000   0.000    0.00      0.000  0.000  0.000  0.000   0.000    0.00
  2  0.0000  0.0000  0.0000  0.0000      0.000  0.000  0.000  0.000   0.000    0.00      0.000  0.000  0.000  0.000   0.000    0.00
  3  0.0000  0.0000  0.0000  0.0080      0.000  0.000  0.000  1.000  -1.000    0.00      0.000  0.000  0.000  1.000  -1.000    0.00
  4  0.0500  0.0000  0.0500  0.0450      1.577  0.000  4.105  4.700  -0.595   82.13      1.961  0.000  5.104  5.900  -0.796  102.13
  5  0.1465  0.0000  0.1465  0.1400      3.023  0.000  7.870  8.000  -0.130   53.73      4.460  0.000 11.610 12.000  -0.390   79.27
  6  0.1616  0.0000  0.1616  0.1650      2.443  0.000  6.358  6.500  -0.142   39.35      4.051  0.000 10.545 11.000  -0.455   65.27
  7  0.1059  0.0000  0.1059  0.1100      1.484  0.000  3.864  3.600   0.264   36.47      2.631  0.000  6.850  7.600  -0.750   64.65
  8  0.0763  0.0000  0.0763  0.0800      1.166  0.000  3.034  2.600   0.434   39.79      2.217  0.000  5.771  5.800  -0.029   75.67
  9  0.0654  0.0000  0.0654  0.0630      0.847  0.000  2.206  1.800   0.406   33.71      1.847  0.000  4.808  4.600   0.208   73.50
 10  0.0456  0.0000  0.0456  0.0480      0.513  0.000  1.335  1.200   0.135   29.25      1.279  0.000  3.330  3.500  -0.170   72.96
 11  0.0317  0.0000  0.0317  0.0360      0.306  0.000  0.796  0.800  -0.004   25.11      0.930  0.000  2.420  2.600  -0.180   76.30
 12  0.0253  0.0000  0.0253  0.0280      0.190  0.000  0.496  0.600  -0.104   19.56      0.685  0.000  1.783  1.900  -0.117   70.36
 13  0.0232  0.0000  0.0232  0.0240      0.150  0.000  0.390  0.400  -0.010   16.82      0.535  0.000  1.391  1.400  -0.009   59.97
 14  0.0210  0.0000  0.0210  0.0200      0.109  0.000  0.285  0.300  -0.015   13.56      0.377  0.000  0.982  1.000  -0.018   56.77
 15  0.0154  0.0000  0.0154  0.0160      0.070  0.000  0.183  0.200  -0.017   11.86      0.237  0.000  0.616  0.500   0.116   39.87
 16  0.0104  0.0000  0.0104  0.0110      0.041  0.000  0.107  0.100   0.007   10.31      0.153  0.000  0.399  0.400  -0.001   38.35
 17  0.0058  0.0000  0.0058  0.0070      0.021  0.000  0.055  0.000   0.055    9.57      0.087  0.000  0.226  0.200   0.026   39.16
 18  0.0029  0.0000  0.0029  0.0040      0.011  0.000  0.028  0.000   0.028    9.68      0.049  0.000  0.127  0.100   0.027   43.18
 19  0.0016  0.0000  0.0016  0.0020      0.005  0.000  0.014  0.000   0.014    8.63      0.029  0.000  0.078  0.000   0.078   46.24
 20  0.0009  0.0000  0.0009  0.0010      0.002  0.000  0.006  0.000   0.006    6.49      0.018  0.000  0.043  0.000   0.043   49.55
 21  0.0004  0.0000  0.0004  0.0000      0.001  0.000  0.002  0.000   0.002    4.22      0.009  0.000  0.022  0.000   0.022   52.74
 22  0.0002  0.0000  0.0002  0.0000      0.000  0.000  0.000  0.000   0.000    1.71      0.004  0.000  0.010  0.000   0.010   55.77
 23  0.0001  0.0000  0.0001  0.0000      0.000  0.000  0.000  0.000   0.000    0.00      0.001  0.000  0.003  0.000   0.003   54.72
 24  0.0000  0.0000  0.0000  0.0000      0.000  0.000  0.000  0.000   0.000    0.00      0.000  0.000  0.001  0.000   0.001   58.80
 25  0.0000  0.0000  0.0000  0.0000      0.000  0.000  0.000  0.000   0.000    0.00      0.000  0.000  0.000  0.000   0.000    0.00
 26  0.0000  0.0000  0.0000  0.0000      0.000  0.000  0.000  0.000   0.000    0.00      0.000  0.000  0.000  0.000   0.000    0.00
 27  0.0000  0.0000  0.0000  0.0000      0.000  0.000  0.000  0.000   0.000    0.00      0.000  0.000  0.000  0.000   0.000    0.00
 28  0.0000  0.0000  0.0000  0.0000      0.000  0.000  0.000  0.000   0.000    0.00      0.000  0.000  0.000  0.000   0.000    0.00
 29  0.0000  0.0000  0.0000  0.0000      0.000  0.000  0.000  0.000   0.000    0.00      0.000  0.000  0.000  0.000   0.000    0.00
 30  0.0000  0.0000  0.0000  0.0000      0.000  0.000  0.000  0.000   0.000    0.00      0.000  0.000  0.000  0.000   0.000    0.00
 31  0.0000  0.0000  0.0000  0.0000      0.000  0.000  0.000  0.000   0.000    0.00      0.000  0.000  0.000  0.000   0.000    0.00
 32  0.0000  0.0000  0.0000  0.0000      0.000  0.000  0.000  0.000   0.000    0.00      0.000  0.000  0.000  0.000   0.000    0.00
 33  0.0000  0.0000  0.0000  0.0000      0.000  0.000  0.000  0.000   0.000    0.00      0.000  0.000  0.000  0.000   0.000    0.00
 34  0.0000  0.0000  0.0000  0.0000      0.000  0.000  0.000  0.000   0.000    0.00      0.000  0.000  0.000  0.000   0.000    0.00
 35  0.0000  0.0000  0.0000  0.0000      0.000  0.000  0.000  0.000   0.000    0.00      0.000  0.000  0.000  0.000   0.000    0.00
 36  0.0000  0.0000  0.0000  0.0000      0.000  0.000  0.000  0.000   0.000    0.00      0.000  0.000  0.000  0.000   0.000    0.00
 37  0.0000  0.0000  0.0000  0.0000      0.000  0.000  0.000  0.000   0.000    0.00      0.000  0.000  0.000  0.000   0.000    0.00
 38  0.0000  0.0000  0.0000  0.0000      0.000  0.000  0.000  0.000   0.000    0.00      0.000  0.000  0.000  0.000   0.000    0.00
```

APPENDIX 7

TEST EXAMPLE FOR DTCHCK

NOTE: This example is similar to the example contained on the computer tape.

Input data and output for single event simulation

```
@ASG,AX  •Q35.
@ASG,AX  •IF01.
@ASG,AX  •IF02.
@ASG,AX  •IF03.
@ASG,AX  •IF04.
@ASG,AX  •IF05.
@ASG,AX  •IF06.
@ASG,AX  •IF07.
@ASG,AX  •IF08.
@ASG,AX  •IF09.
@ASG,AX  •IF10.
@ASG,AX  •IF11.
@ASG,AX  •IF12.
@ASG,AX  •IF13.
@ASG,AX  •IF14.
@ASG,AX  •IF15.
@ASG,AX  •IF16.
@ASG,AX  •IF17.
@ASG,AX  •IF18.
@ASG,AX  •IF19.
@ASG,AX  •IF20.
```

```
WASG,AX  •IF21•
WASG,AX  •IF22•
WASG,AX  •IF23•
WASG,AX  •IF24•
WASG,AX  •IF25•
WASG,AX  •IF26•
WUSE  11,•IF01•
WUSE  12,•IF02•
WUSE  13,•IF03•
WUSE  15,•IF05•
WUSE  16,•IF06•
WUSE  17,•IF07•
WUSE  18,•IF08•
WUSE  19,•IF09•
WUSE  20,•IF10•
WUSE  21,•IF11•
WUSE  22,•IF12•
WUSE  23,•IF13•
WUSE  24,•IF14•
WUSE  25,•IF15•
WUSE  26,•IF16•
```

```
@USE  27,.IF17.

@ASG,AX  .NET.

@ASG,AX  .RAIN.

@ASG,AX  .QUANT.

@ASG,AX  .QUALT.

@DELETE,C  .DRAI.
FURPUR 27R3-1/UKA E33 SL73R1 05/16/79 20:47:48

.DRAI  IS NOT CATALOGUED OR ASSIGNED
FAC STATUS: 400010000000

@ASG,T  .DRAI.,F14///300

@DATA,IL  .NET.
DATA 17 RL70-5 05/16-20:47:49
    1.      QWS-EPA-EXAMPLE
    2.                 1.00101.0 1.0 1.0 1.0 1.0            11106561750            45 51
    3.        C001C002  C002C003  C003C004  C004C005  C005R006  R006C007  C007C008  C008C009
    4.        C009C010  C010C011  C011C031  C013C014  C014R015  R015C016  C016B006
    5.        C003C024  C024C025  C025C026  C026C027  C027C032
    6.        R026C029  C029C030  C030C031  C031C032  C032C033  C033C034  C034C035  C035C036
    7.        C036C037  C037R038  R038B038  B038C039
    8.        S0135014
    9.      XX
   10.      R015R028R038
   11.      XXAX
   12.      B006R038
   13.      XXXX
   14.      0   C037
   15.      1   R015R028R038
   16.      2
   17.      3
   18.      4
   19.      5
   20.      REGEN          5    0
   21.                    10    0
   22.                    15  160
   23.                    20  640
   24.                    25  560
   25.                    30  100
   26.                    35   80
   27.                    40  160
   28.                    45   40
   29.                    50   40
   30.                    55   40
   31.                    60   40
   32.                    65   60
   33.                    70   20
   34.      REGEN         75   20
   35.      1C001C002             01 .40  .40260.   63.87  60.84
   36.      1C002C003C001         01 .40  .40100.   60.84  59.68
```

```
 37.       1C003C004C002         01 .40   .40290.    59.68  57.70
 38.       1C004C005C003         01 .50   .50240.    57.50  55.60
 39.       1C005B006C004         011.00 1.00145.    55.40  53.50
 40.       1B006C007C005C016     01 .30   .30165.    51.39  44.97
 41.       1C007C008B006         01 .40   .40250.    44.97  36.29
 42.       1C008C009C007         01 .50   .50225.    36.29  33.57
 43.       1C009C010C008         01 .50   .50184.    33.57  30.87
 44.       1C010C011C009         01 .50   .50172.    30.87  26.74
 45.       1C011C031C010         01 .50   .50 92.    26.74  24.98
 46.       1C013C014             011.00 1.00120.    54.76  54.40
 47.       1C014R015C013         011.00 1.00 92.    54.40  54.12
 48.       1R015C016C014         01 .20   .20130.    53.92  53.53
 49.       1S013S014             01 .40   .40120.    54.76  54.40
 50.       1S014S015S013         01 .40   .40 92.    54.40  54.12
 51.       1S015C016S014         01 .40   .40130.    54.12  53.73
 52.       1C016B006R015S015     01 .60   .60182.    53.33  52.61
 53.       1C003C024C002         01 .40   .40220.    59.68  53.00
 54.       1C024C025C003         01 .40   .40200.    52.31  44.89
 55.       1C025C026C024         01 .40   .40180.    44.89  38.00
 56.       1C026C027C025         01 .60   .60212.    37.47  30.05
 57.       1C027C032C026         01 .60   .60198.    29.59  23.53
 58.       1R028C029             01 .50   .50232.    26.55  25.75
 59.       1C029C030R028         01 .60   .60169.    25.75  25.33
 60.       1C030C031C029         01 .60   .60167.    25.33  24.91
 61.       1C031C032C011C030     01 .80   .80137.    24.02  22.65
 62.       1C032C033C031C027     01 .80   .80272.    22.65  18.67
 63.       1C033C034C032         011.00 1.00152.    18.67  16.07
 64.       1C034C035C033         011.00 1.00167.    16.07  14.30
 65.       1C035C036C034         011.00 1.00167.    14.30  12.77
 66.       1C036C037C035         011.00 1.00214.    12.77  11.66
 67.       1C037R038C036         011.20 1.20138.    11.66  11.23
 68.       1R038B038C037         01 .50   .50100.    10.43  10.27
 69.       1B038C039R038         011.20 1.20100.    21.20  21.10
 70.        ENDE
 71.       2R0151C0160.20 5.00 53.92
 72.       2R0281C0290.5010.00 26.55
 73.       2R0381B0380.5020.00 10.43
 74.       2B0062                 51.39   800.0.655.001
 75.       2B0383                  9.00   500.0.655.001        2        0.40 0.020
 76.        ENDE
 77.       1C034 0.16 0.15  10  30R028C029 0.0
 78.        ENDE
 79.       3AC01C00112 26.03 .10  82
 80.       3AC04C00412 11.65 .25  90
 81.       3AC05C00512 10.52 .18  57
 82.       3AC06B00612 30.18 .23  31
 83.       3AC13C01312 50.10 .14
 84.       3AS13S01312 50.10      26
 85.       3AC26C02614 20.48 .02  25
 86.       3AC28R02813 79.52 .40  18
 87.       3AC31C03111 17.83 .30  28
 88.       3AC32C03212 21.90 .29  32
 89.       3AC33C03312 14.50 .15  18
 90.       3AC37C03713 50.52 .07   9
 91.        ENDE
END DATA.

@DATA,IL  *QUANT.
DATA T7 RL70-5 05/16-20:47:52
    1.       QQS-EPA-EXAMPLE
    2.       01  111      .7853962  .2500000 1.0000000REISPROFIL
    3.       AA
    4.      XXXX
    5.      1COMMERCIAL         2RESIDENTIAL          3INDUSTRIE           4PARKS
    6.      MULDENKAPAZITAETEN     .6010.0    .6010.0  1.0 12.0    .8010.0
    7.      MULDENINITIALWERTE 1  .6010.0    .8010.0  1.0 12.0    .8010.0
    8.      VERSICKERUNGSRATEN    27.7 27.7 27.7 48.6 27.7 27.7 27.7 48.6
    9.      VERDUNSTUNGSRATEN                .60  .70  .97 1.15 1.35 1.55 1.75 2.05 2.30 2.55
   10.                                      2.80 3.20 3.60 4.00 4.40 4.80 5.25 5.70 6.20 6.70
   11.                                      7.20 7.70 8.20 8.70 9.20 9.7510.2510.8011.3011.80
   12.                                     12.3512.9013.4013.9014.4014.9015.4516.0016.5017.00
   13.                                     18.0 18.5  19. 19.5  20. 20.5  21. 21.5  22. 22.5
   14.      TEMPERATUREN     3    3.0013.00
   15.      56            0.1  0.1  1.5  1.1  7.0 10.9 14.2 11.9  9.5  1.7  0.1  0.1
   16.      60            0.1  0.1  0.1  1.6  5.7 10.7 12.2 11.9 11.7  3.8  2.8  1.2
   17.      65            0.1  0.1  0.1  1.5  7.1 11.1 14.0 12.7  7.8  5.9  2.9  0.1
   18.      56            2.4  4.0  7.4  8.6 14.3 19.3 22.7 19.7 15.6  9.7  5.2  3.0
   19.      60            3.4  4.0 14.1 12.7 15.9 19.2 18.4 19.2 16.5  9.1  6.4  6.0
   20.      65            2.0  1.9  2.4  8.3 15.1 18.1 22.1 22.4 15.1  9.5  7.1  1.0
   21.      EINHEITSGANGLINIEN   5. .200    .064    .180    .064    .200    .064    .055    .064
   22.                          10. .410    .110    .370    .110    .410    .110    .150    .110
   23.                          15. .222    .120    .230    .120    .222    .120    .240    .120
   24.                          20. .190    .118    .100    .118    .190    .118    .200    .118
   25.                          25. .050    .109    .060    .109    .050    .109    .130    .109
   26.                          30. .030    .097    .035    .097    .030    .097    .090    .097
   27.                          35. .010    .082    .020    .082    .010    .082    .060    .082
   28.                          40. .005    .067    .010    .067    .005    .067    .040    .067
   29.                          45.         .053    .005    .053            .053    .030    .053
   30.                          50.         .043    .002    .043            .043    .020    .043
   31.                          55.         .033            .033            .033    .010    .033
   32.                          60.         .026            .026            .026    .005    .026
   33.                          65.         .020            .020            .020    .003    .020
   34.                          70.         .016            .016            .016    .001    .016
   35.                          75.         .011            .011            .011            .011
   36.                          80.         .009            .009            .009            .009
   37.                          85.         .007            .007            .007            .007
   38.                          90.         .005            .005            .005            .005
   39.                          95.         .004            .004            .004            .004
   40.                         100.         .003            .003            .003            .003
   41.                         105.         .002            .002            .002            .002
   42.      EINHEITSGANGLINIEN 110.         .001            .001            .001            .001
   43.      TW-ABFLUESSE          0.00 4.05 4.00 4.05 8.00 4.0512.00 4.0516.00 4.0520.00 4.05
   44.      TW-ABFLUESSE          0.30 4.05 4.30 4.05 8.30 4.0512.30 4.0516.30 4.0520.30 4.05
   45.      TW-ABFLUESSE          1.00 4.05 5.00 4.05 9.00 4.0513.00 4.0517.00 4.0521.00 4.05
   46.      TW-ABFLUESSE          1.30 4.05 5.30 4.05 9.30 4.0513.30 4.0517.30 4.0521.30 4.05
   47.      TW-ABFLUESSE          2.00 4.05 6.00 4.0510.00 4.0514.00 4.0518.00 4.0522.00 4.05
   48.      TW-ABFLUESSE          2.30 4.05 6.30 4.0510.30 4.0514.30 4.0518.30 4.0522.30 4.05
   49.      TW-ABFLUESSE          3.00 4.05 7.00 4.0511.00 4.0515.00 4.0519.00 4.0523.00 4.05
   50.      TW-ABFLUESSE          3.30 4.05 7.30 4.0511.30 4.0515.30 4.0519.30 4.0523.30 4.05
   51.      TW-ABFLUESSE         1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
   52.                           1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
   53.                           1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
   54.                           1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
   55.      XXXX
   56.      XXAX
   57.      XXXX
   58.                 -1
END DATA.


WDATA,IL   *QUALT.
DATA T7 RL70-5 05/16-20:47:54
    1.      QQS-EPA-EXAMPLE
    2.      1  B.O.D.            2  T.S.S.             312FECAL COLIFORM    4  COD
    3.       10.0 15.0 20.0 15.0 75.0 80.0110.0 80.0100.0100.0100.0160.0 50.0 60.0 70.0 60.0
```

```
 10.0 15.0 20.0 15.0 75.0 80.0110.0 80.0100.0100.0100.0100.0 50.0 60.0 70.0 60.0
AUFBAUZEITEN      240 240 240 240 720 720 720 720  24  24  24  24 240 240 240 240
-34.2-34.2-34.2-34.2-34.7-34.7-34.6-34.713.3413.3413.3413.34-34.2-34.2-34.2-34.2
 1.89 1.89 1.89 1.89  .21  .21  .44  .211133.1133.1133.1133. 1.89 1.89 1.89 1.89
465.2465.2465.2465.286.3486.34113.686.343825.3825.3825.3825.465.2465.2465.2465.2
STRASSENREINIGUNG    168    84     5 35 35  5 10 40 40 10  8 30 30  8  5 35 35  5
EINHEITSGANGLINIEN SCHMUTZSTOFF 1    5.0   4.10         3.08        3.08        4.10
                                1   10.0   4.28         3.21        3.21        4.28
                                1   15.0   2.00         1.50        1.50        2.00
                                1   20.0   1.03         0.77        0.77        1.03
                                1   25.0   0.65         0.47        0.49        0.65
                                1   30.0   0.37         0.28        0.28        0.37
                                1   35.0   0.19         0.14        0.14        0.19
                                1   40.0   0.04         0.03        0.03        0.04
                                1   45.0   0.00         0.00        0.00        0.00
                                1   50.0   0.00         0.00        0.00        0.00
                                1   55.0   0.00         0.00        0.00        0.00
EINHEITSGANGLINIEN SCHMUTZSTOFF 1   60.0   0.00         0.00        0.00        0.00
EINHEITSGANGLINIEN SCHMUTZSTOFF 2    5.0   5.10         3.83        7.65        5.10
                                2   10.0   7.15         5.36       10.73        7.15
                                2   15.0   3.51         2.63        5.27        3.51
                                2   20.0   2.05         1.54        3.08        2.05
                                2   25.0   1.35         1.01        2.03        1.35
                                2   30.0   0.90         0.68        1.35        0.90
                                2   35.0   0.60         0.45        0.90        0.60
                                2   40.0   0.35         0.26        0.53        0.35
                                2   45.0   0.20         0.15        0.30        0.20
                                2   50.0   0.09         0.07        0.14        0.09
                                2   55.0   0.02         0.02        0.03        0.02
EINHEITSGANGLINIEN SCHMUTZSTOFF 2   60.0   0.00         0.00        0.00        0.00
EINHEITSGANGLINIEN SCHMUTZSTOFF 3    5.0  15.00        15.00        7.50       15.00
                                3   10.0  39.50        39.50       19.75       39.50
                                3   15.0  30.00        30.00       15.00       30.00
                                3   20.0  19.00        19.00        9.50       19.00
                                3   25.0  10.00        10.00        5.00       10.00
                                3   30.0   5.50         5.50        2.75        5.50
                                3   35.0   3.50         3.50        1.75        3.50
                                3   40.0   2.00         2.00        1.00        2.00
                                3   45.0   1.50         1.50        0.75        1.50
                                3   50.0   1.00         1.00        0.50        1.00
                                3   55.0   0.50         0.50        0.25        0.50
EINHEITSGANGLINIEN SCHMUTZSTOFF 3   60.0   0.00         0.00        0.00        0.00
EINHEITSGANGLINIEN SCHMUTZSTOFF 4    5.0  15.40        15.4        15.4        15.40
                                4   10.0  16.05        16.05       16.05       16.05
                                4   15.0   7.50         7.50        7.50        7.50
                                4   20.0   3.85         3.85        3.85        3.85
                                4   25.0   2.45         2.45        2.45        2.45
                                4   30.0   1.40         1.40        1.40        1.40
                                4   35.0   0.70         0.70        0.70        0.70
                                4   40.0   0.15         0.15        0.15        0.15
                                4   45.0   0.00         0.00        0.00        0.00
                                4   50.0   0.00         0.00        0.00        0.00
                                4   55.0   0.00         0.00        0.00        0.00
EINHEITSGANGLINIEN SCHMUTZSTOFF 4   60.0   0.00         0.00        0.00        0.00
GEBIETSFAKTOREN 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
REGENDAUER    5.01.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.00
             10.01.001.001.001.001.001.001.001.00 .94 .91 .91 .941.001.001.001.00
             15.0 .98 .96 .96 .98 .99 .99 .991.00 .88 .83 .83 .88 .98 .96 .96 .98
             20.0 .90 .87 .87 .90 .98 .98 .98 .99 .80 .75 .75 .80 .90 .87 .87 .90
             25.0 .76 .70 .73 .77 .97 .95 .96 .98 .73 .66 .67 .73 .76 .70 .73 .77
             30.0 .64 .55 .58 .67 .93 .88 .90 .95 .67 .58 .60 .67 .64 .55 .58 .67
             35.0 .55 .45 .49 .57 .87 .79 .83 .90 .60 .51 .53 .60 .55 .45 .49 .59
             40.0 .48 .38 .42 .55 .78 .66 .72 .84 .54 .43 .46 .54 .48 .38 .42 .55
 67.                        45.0 .43 .33 .37 .51 .69 .55 .61 .76 .48 .37 .41 .48 .43 .33 .37 .51
 68.                        50.0 .38 .29 .33 .48 .59 .45 .52 .66 .44 .31 .36 .44 .38 .29 .33 .48
 69.                        55.0 .35 .27 .31 .46 .53 .39 .46 .59 .39 .28 .32 .39 .35 .27 .31 .46
 70.                        60.0 .33 .25 .29 .44 .48 .35 .42 .54 .36 .23 .28 .36 .33 .25 .29 .44
 71.                        65.0 .32 .23 .28 .43 .44 .32 .39 .49 .33 .22 .26 .33 .32 .23 .28 .43
 72.                        70.0 .31 .22 .27 .42 .42 .31 .37 .47 .32 .21 .25 .32 .31 .22 .27 .42
 73.                        75.0 .30 .21 .26 .41 .41 .31 .36 .46 .31 .20 .24 .31 .30 .21 .26 .41
 74.                        80.0 .30 .20 .25 .40 .40 .30 .35 .40 .30 .20 .23 .30 .30 .20 .25 .40
 75.                        85.0 .30 .20 .25 .40 .40 .30 .35 .40 .30 .20 .23 .30 .30 .20 .25 .40
 76.                        90.0 .30 .20 .25 .40 .40 .30 .35 .40 .30 .20 .23 .30 .30 .20 .25 .40
 77.                        95.0 .30 .20 .25 .40 .40 .30 .35 .40 .30 .20 .23 .30 .30 .20 .25 .40
 78.                       100.0 .30 .20 .25 .40 .40 .30 .35 .40 .30 .20 .23 .30 .30 .20 .25 .40
 79.       TAGESZEITEINFLUSS     0.00 0.80 0.80 1.00 0.80      12.00 1.00 1.00 0.60 1.00
 80.                             0.30 0.80 0.80 1.00 0.80      12.30 1.00 1.00 0.57 1.00
 81.                             1.00 0.80 0.80 1.00 0.80      13.00 1.00 1.00 0.55 1.00
 82.                             1.30 0.80 0.80 1.00 0.80      13.30 1.00 1.00 0.55 1.00
 83.                             2.00 0.80 0.80 1.00 0.80      14.00 0.99 0.99 0.55 0.99
 84.                             2.30 0.80 0.80 1.00 0.80      14.30 0.98 0.98 0.60 0.98
 85.                             3.00 0.80 0.80 1.00 0.80      15.00 0.97 0.97 0.65 0.97
 86.                             3.30 0.80 0.80 1.00 0.80      15.30 0.98 0.98 0.70 0.98
 87.                             4.00 0.82 0.82 1.00 0.82      16.00 0.99 0.99 0.80 0.99
 88.                             4.30 0.84 0.84 1.00 0.84      16.30 1.00 1.00 0.90 1.00
 89.                             5.00 0.86 0.86 1.00 0.86      17.00 1.00 1.00 1.00 1.00
 90.                             5.30 0.89 0.89 1.00 0.89      17.30 1.00 1.00 1.00 1.00
 91.                             6.00 0.92 0.92 1.00 0.92      18.00 1.00 1.00 1.00 1.00
 92.                             6.30 0.95 0.95 1.00 0.95      18.30 1.00 1.00 1.00 1.00
 93.                             7.00 1.00 1.00 1.00 1.00      19.00 0.98 0.98 1.00 0.98
 94.                             7.30 1.00 1.00 1.00 1.00      19.30 0.96 0.96 1.00 0.96
 95.                             8.00 1.00 1.00 0.95 1.00      20.00 0.94 0.94 1.00 0.94
 96.                             8.30 1.00 1.00 0.90 1.00      20.30 0.92 0.92 1.00 0.92
 97.                             9.00 0.99 0.99 0.85 0.99      21.00 0.90 0.90 1.00 0.90
 98.                             9.30 0.98 0.98 0.80 0.98      21.30 0.88 0.88 1.00 0.88
 99.                            10.00 0.97 0.97 0.75 0.97      22.00 0.86 0.86 1.00 0.86
100.                            10.30 0.98 0.98 0.70 0.98      22.30 0.84 0.84 1.00 0.84
101.                            11.00 0.99 0.99 0.65 0.99      23.00 0.82 0.82 1.00 0.82
102.                            11.30 1.00 1.00 0.60 1.00      23.30 0.80 0.80 1.00 0.80
103.       JAHRESZEITEINFLUSS 1  .80  .75  .80  .90  .87  .80  .75  .75  .82  .93 1.00  .98
104.       JAHRESZEITEINFLUSS 2  .99 1.00  .94  .89  .80  .80  .80  .80  .80  .80  .89  .92
105.       JAHRESZEITEINFLUSS 3  .90  .92  .96  .60  .82  .94  .99 1.00  .96  .77  .55  .43
106.       JAHRESZEITEINFLUSS 4  .80  .75  .80  .90  .87  .80  .75  .75  .82  .93 1.00  .98
107.       BECKENKLAERWIRKUNG           5 86 68 99 86       105 69 32 93 69       205 65 30 90 65
108.                                   10 81 45 99 81       110 68 31 93 68       210 65 30 90 65
109.                                   15 78 42 98 78       115 68 31 93 68       215 65 30 90 65
110.                                   20 76 40 98 76       120 68 31 92 68       220 65 30 90 65
111.                                   25 75 39 97 75       125 68 31 92 68       225 65 30 89 65
112.                                   30 74 38 97 74       130 67 31 92 67       230 65 30 89 65
113.                                   35 73 37 97 73       135 67 31 92 67       235 65 30 89 65
114.                                   40 73 36 96 73       140 67 31 92 67       240 65 30 89 65
115.                                   45 72 36 96 72       145 67 31 92 67       245 65 30 89 65
116.                                   50 72 35 96 72       150 67 31 91 67       250 65 30 89 65
117.                                   55 72 35 95 72       155 66 31 91 66       255 65 30 89 65
118.                                   60 71 34 95 71       160 66 31 91 66       260 65 30 89 65
119.                                   65 71 34 95 71       165 66 31 91 66       265 65 30 89 65
120.                                   70 71 33 95 71       170 66 31 91 66       270 65 30 88 65
121.                                   75 70 33 94 70       175 66 31 91 66       275 65 30 88 65
122.                                   80 70 33 94 70       180 65 30 91 65       280 65 30 88 65
123.                                   85 70 33 94 70       185 65 30 90 65       285 65 30 88 65
124.                                   90 69 32 94 69       190 65 30 90 65       290 65 30 86 65
125.                                   95 69 32 94 69       195 65 30 90 65       295 65 30 88 65
126.                                  100 69 32 93 69       200 65 30 90 65       300 65 30 88 65
127.       BECKENKLAERWIRKUNG         0.5 86 68 98 86       8.5 58 30 83 58      16.5 58 30 73 58
128.                                  1.0 78 48 97 78       9.0 58 30 82 58      17.0 58 30 73 58
129.                                  1.5 74 42 95 74       9.5 58 30 81 58      17.5 58 30 72 58
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130.                               2.0 68 38 95 68      10.0 58 30 80 58      18.0 58 30 72 58
131.                               2.5 66 35 93 66      10.5 58 30 79 58      18.5 58 30 71 58
132.                               3.0 64 33 92 64      11.0 58 30 79 58      19.0 58 30 71 58
133.                               3.5 62 32 91 62      11.5 58 30 78 58      19.5 58 30 70 58
134.                               4.0 61 31 90 61      12.0 58 30 78 58      20.0 58 30 70 58
135.                               4.5 60 31 89 60      12.5 58 30 77 58      20.5 58 30 70 58
136.                               5.0 59 30 88 59      13.0 58 30 77 58      21.0 58 30 70 58
137.                               5.5 58 30 87 58      13.5 58 30 76 58      21.5 58 30 70 58
138.                               6.0 58 30 86 58      14.0 58 30 75 58      22.0 58 30 70 58
139.                               6.5 58 30 85 58      14.5 58 30 75 58      22.5 58 30 70 58
140.                               7.0 58 30 84 58      15.0 58 30 75 58      23.0 58 30 70 58
141.                               7.5 58 30 84 58      15.5 58 30 74 58      23.5 58 30 70 58
142.                               8.0 58 30 83 58      16.0 58 30 74 58      24.0 58 30 70 58
143.        TW-SCHMUTZMENGEN  1  0.00250.0250.0250.0250.0    12.00250.0250.0250.0250.0
144.                             0.30250.0250.0250.0250.0    12.30250.0250.0250.0250.0
145.                             1.00250.0250.0250.0250.0    13.00250.0250.0250.0250.0
146.                             1.30250.0250.0250.0250.0    13.30250.0250.0250.0250.0
147.                             2.00250.0250.0250.0250.0    14.00250.0250.0250.0250.0
148.                             2.30250.0250.0250.0250.0    14.30250.0250.0250.0250.0
149.                             3.00250.0250.0250.0250.0    15.00250.0250.0250.0250.0
150.                             3.30250.0250.0250.0250.0    15.30250.0250.0250.0250.0
151.                             4.00250.0250.0250.0250.0    16.00250.0250.0250.0250.0
152.                             4.30250.0250.0250.0250.0    16.30250.0250.0250.0250.0
153.                             5.00250.0250.0250.0250.0    17.00250.0250.0250.0250.0
154.                             5.30250.0250.0250.0250.0    17.30250.0250.0250.0250.0
155.                             6.00250.0250.0250.0250.0    18.00250.0250.0250.0250.0
156.                             6.30250.0250.0250.0250.0    18.30250.0250.0250.0250.0
157.                             7.00250.0250.0250.0250.0    19.00250.0250.0250.0250.0
158.                             7.30250.0250.0250.0250.0    19.30250.0250.0250.0250.0
159.                             8.00250.0250.0250.0250.0    20.00250.0250.0250.0250.0
160.                             8.30250.0250.0250.0250.0    20.30250.0250.0250.0250.0
161.                             9.00250.0250.0250.0250.0    21.00250.0250.0250.0250.0
162.                             9.30250.0250.0250.0250.0    21.30250.0250.0250.0250.0
163.                            10.00250.0250.0250.0250.0    22.00250.0250.0250.0250.0
164.                            10.30250.0250.0250.0250.0    22.30250.0250.0250.0250.0
165.                            11.00250.0250.0250.0250.0    23.00250.0250.0250.0250.0
166.                            11.30250.0250.0250.0250.0    23.30250.0250.0250.0250.0
167.        TA-SCHMUTZMENGEN  2  0.00280.0280.0280.0280.0    12.00280.0280.0280.0280.0
168.                             0.30280.0280.0280.0280.0    12.30280.0280.0280.0280.0
169.                             1.00280.0280.0280.0280.0    13.00280.0280.0280.0280.0
170.                             1.30280.0280.0280.0280.0    13.30280.0280.0280.0280.0
171.                             2.00280.0280.0280.0280.0    14.00280.0280.0280.0280.0
172.                             2.30280.0280.0280.0280.0    14.30280.0280.0280.0280.0
173.                             3.00280.0280.0280.0280.0    15.00280.0280.0280.0280.0
174.                             3.30280.0280.0280.0280.0    15.30280.0280.0280.0280.0
175.                             4.00280.0280.0280.0280.0    16.00280.0280.0280.0280.0
176.                             4.30280.0280.0280.0280.0    16.30280.0280.0280.0280.0
177.                             5.00280.0280.0280.0280.0    17.00280.0280.0280.0280.0
178.                             5.30280.0280.0280.0280.0    17.30280.0280.0280.0280.0
179.                             6.00280.0280.0280.0280.0    18.00280.0280.0280.0280.0
180.                             6.30280.0280.0280.0280.0    18.30280.0280.0280.0280.0
181.                             7.00280.0280.0280.0280.0    19.00280.0280.0280.0280.0
182.                             7.30280.0280.0280.0280.0    19.30280.0280.0280.0280.0
183.                             8.00280.0280.0280.0280.0    20.00280.0280.0280.0280.0
184.                             8.30280.0280.0280.0280.0    20.30280.0280.0280.0280.0
185.                             9.00280.0280.0280.0280.0    21.00280.0280.0280.0280.0
186.                             9.30280.0280.0280.0280.0    21.30280.0280.0280.0280.0
187.                            10.00280.0280.0280.0280.0    22.00280.0280.0280.0280.0
188.                            10.30280.0280.0280.0280.0    22.30280.0280.0280.0280.0
189.                            11.00280.0280.0280.0280.0    23.00280.0280.0280.0280.0
190.                            11.30280.0280.0280.0280.0    23.30280.0280.0280.0280.0
191.        TA-SCHMUTZMENGEN  3  0.00 20.0 20.0 20.0 20.0    12.00 20.0 20.0 20.0 20.0
192.                             0.30 20.0 20.0 20.0 20.0    12.30 20.0 20.0 20.0 20.0
```

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   193.                              1.00 20.0 20.0 20.0 20.0       13.00 20.0 20.0 20.0 20.0
   194.                              1.30 20.0 20.0 20.0 20.0       13.30 20.0 20.0 20.0 20.0
   195.                              2.00 20.0 20.0 20.0 20.0       14.00 20.0 20.0 20.0 20.0
   196.                              2.30 20.0 20.0 20.0 20.0       14.30 20.0 20.0 20.0 20.0
   197.                              3.00 20.0 20.0 20.0 20.0       15.00 20.0 20.0 20.0 20.0
   198.                              3.30 20.0 20.0 20.0 20.0       15.30 20.0 20.0 20.0 20.0
   199.                              4.00 20.0 20.0 20.0 20.0       16.00 20.0 20.0 20.0 20.0
   200.                              4.30 20.0 20.0 20.0 20.0       16.30 20.0 20.0 20.0 20.0
   201.                              5.00 20.0 20.0 20.0 20.0       17.00 20.0 20.0 20.0 20.0
   202.                              5.30 20.0 20.0 20.0 20.0       17.30 20.0 20.0 20.0 20.0
   203.                              6.00 20.0 20.0 20.0 20.0       18.00 20.0 20.0 20.0 20.0
   204.                              6.30 20.0 20.0 20.0 20.0       18.30 20.0 20.0 20.0 20.0
   205.                              7.00 20.0 20.0 20.0 20.0       19.00 20.0 20.0 20.0 20.0
   206.                              7.30 20.0 20.0 20.0 20.0       19.30 20.0 20.0 20.0 20.0
   207.                              8.00 20.0 20.0 20.0 20.0       20.00 20.0 20.0 20.0 20.0
   208.                              8.30 20.0 20.0 20.0 20.0       20.30 20.0 20.0 20.0 20.0
   209.                              9.00 20.0 20.0 20.0 20.0       21.00 20.0 20.0 20.0 20.0
   210.                              9.30 20.0 20.0 20.0 20.0       21.30 20.0 20.0 20.0 20.0
   211.                             10.00 20.0 20.0 20.0 20.0       22.00 20.0 20.0 20.0 20.0
   212.                             10.30 20.0 20.0 20.0 20.0       22.30 20.0 20.0 20.0 20.0
   213.                             11.00 20.0 20.0 20.0 20.0       23.00 20.0 20.0 20.0 20.0
   214.                             11.30 20.0 20.0 20.0 20.0       23.30 20.0 20.0 20.0 20.0
   215.    TW-SCHMUTZMENGEN    4     0.00 360. 360. 360. 360.       12.00 360. 360. 360. 360.
   216.                              0.30 360. 360. 360. 360.       12.30 360. 360. 360. 360.
   217.                              1.00 360. 360. 360. 360.       13.00 360. 360. 360. 360.
   218.                              1.30 360. 360. 360. 360.       13.30 360. 360. 360. 360.
   219.                              2.00 360. 360. 360. 360.       14.00 360. 360. 360. 360.
   220.                              2.30 360. 360. 360. 360.       14.30 360. 360. 360. 360.
   221.                              3.00 360. 360. 360. 360.       15.00 360. 360. 360. 360.
   222.                              3.30 360. 360. 360. 360.       15.30 360. 360. 360. 360.
   223.                              4.00 360. 360. 360. 360.       16.00 360. 360. 360. 360.
   224.                              4.30 360. 360. 360. 360.       16.30 360. 360. 360. 360.
   225.                              5.00 360. 360. 360. 360.       17.00 360. 360. 360. 360.
   226.                              5.30 360. 360. 360. 360.       17.30 360. 360. 360. 360.
   227.                              6.00 360. 360. 360. 360.       18.00 360. 360. 360. 360.
   228.                              6.30 360. 360. 360. 360.       18.30 360. 360. 360. 360.
   229.                              7.00 360. 360. 360. 360.       19.00 360. 360. 360. 360.
   230.                              7.30 360. 360. 360. 360.       19.30 360. 360. 360. 360.
   231.                              8.00 360. 360. 360. 360.       20.00 360. 360. 360. 360.
   232.                              8.30 360. 360. 360. 360.       20.30 360. 360. 360. 360.
   233.                              9.00 360. 360. 360. 360.       21.00 360. 360. 360. 360.
   234.                              9.30 360. 360. 360. 360.       21.30 360. 360. 360. 360.
   235.                             10.00 360. 360. 360. 360.       22.00 360. 360. 360. 360.
   236.                             10.30 360. 360. 360. 360.       22.30 360. 360. 360. 360.
   237.                             11.00 360. 360. 360. 360.       23.00 360. 360. 360. 360.
   238.                             11.30 360. 360. 360. 360.       23.30 360. 360. 360. 360.
   239.    TW-KONZENTRATION           270. 250.  20. 360.
   240.    XXXX
   241.    XXXX
   242.    XXXX
   243.         -1.0
END DATA.

WUSE  2,*RAIN.

WUSE  3,*QUANT.

WUSE  4,*QUALT.
WXQT  WQS.DTCHCK
```

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QQS-EPA-EXAMPLE
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                                             D A T E N P R U E F U N G   Q Q S
                                             *********************************

                                           DIE MIT (F) GEKENNZEICHNETEN MITTEILUNGEN
                                         VERHINDERN DIE AUSFUEHRUNG DES BERECHNUNGSTEILS

                                             ALLE ANDEREN SIND NUR INFORMATIV

A) FILE NETZDATEN
-----------------


    DIE EINGABE ERFOLGT IN METRISCHEN EINHEITEN

    EINGABE DER KANALNETZDATEN

1) VORLAUFKARTEN
----------------


    PROGNOSEFAKTOREN     1.00     1.00     1.00     1.00     1.00     1.00

    ANFANGSZEITPUNKT = 11. 6.1956 17 UHR 50 MINUTEN
    ENDZEITPUNKT =        0. 0.19 0  0 UHR  0 MINUTEN

    LASTFALL = 1   EINZELEREIGNIS   REGENINTENSITAETEN WERDEN EINGELESEN

     33 AUSGABEROHRE
    C001 C002     C002 C003     C003 C004     C004 C005     C005 R006     R006 C007     C007 C008     C008 C009     C009 C010
    C010 C011     C011 C031     C013 C014     C014 R015     R015 C016     C016 R006     C003 C024     C024 C025     C025 C026
    C026 C027     C027 C032     R028 C029     C029 C030     C030 C031     C031 C032     C032 C033     C033 C034     C034 C035
    C035 C036     C036 C037     C037 R038     R038 R038     R038 C039     S013 S014

     3 AUSGABEKNOTEN (RUE)
    R015  R028  R038

     2 AUSGABEKNOTEN (RHB)
    R006  R038

     0 INTERESSANTE KNOTEN

     0 KNOTEN MIT KONSTANTER UEBERNAHME

     0 KNOTEN MIT VARIABLER UEBERNAHME

    RECHENDAUER    95 INTERVALLE
    REGENDAUER     15 INTERVALLE

                    REGENINTENSITAETEN   REIHE 1

                                   5          0
                                  10          0
                                  15        160
                                  20        690
                                  25        560
                                  30        100
                                  35         80
                                  40         160
                                  45          40
                                  50          40
                                  55          40
                                  60          40
                                  65          60
                                  70          20
                                  75          20

2) ROHRELEMENTKARTEN
--------------------

   ROHR KA = ROIS KE = C016 PROFILHOEHE =  .20 (LFN  14)

   ANZAHL DER ROHRELEMENTE     35

   ANZAHL DER KNOTEN     35
```

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                                             R O H R E L E M E N T K A R T E N
                                             *********************************

 LFN   KA    KE    ZU1   ZU2   ZU3   AB1   AB2   PKZ     H       B       L        SA         SE          GA         GE         KS

   1  C001  C002                     C003          01    .40     .40  260.00    63.8700    60.8400     .0000      .0000      .0010
   2  C002  C003  C001               C004  C024    01    .40     .40  100.00    60.8400    59.6800     .0000      .0000      .0010
   3  C003  C004  C002               C005          01    .40     .40  290.00    59.6800    57.7000     .0000      .0000      .0010
   4  C004  C005  C003               B006          01    .50     .50  240.00    57.5000    55.6000     .0000      .0000      .0010
   5  C005  B006  C004               C007          01   1.00    1.00  145.00    55.4000    53.5000     .0000      .0000      .0010
   6  B006  C007  C005  C016         C008          01    .30     .30  185.00    51.3900    44.9700     .0000      .0000      .0010
   7  C007  C008  B006               C009          01    .40     .40  250.00    44.9700    36.2900     .0000      .0000      .0010
   8  C008  C009  C007               C010          01    .50     .50  225.00    36.2900    33.5700     .0000      .0000      .0010
   9  C009  C010  C008               C011          01    .50     .50  184.00    33.5700    30.8700     .0000      .0000      .0010
  10  C010  C011  C009               C031          01    .50     .50  172.00    30.8700    26.7400     .0000      .0000      .0010
  11  C011  C031  C010               C032          01    .50     .50   92.00    26.7400    24.9800     .0000      .0000      .0010
  12  C013  C014                     R015          01   1.00    1.00  120.00    54.7600    54.4000     .0000      .0000      .0010
  13  C014  R015  C013               C016          01   1.00    1.00   92.00    54.4000    54.1200     .0000      .0000      .0010
  14  R015  C016  C014               B006          01    .20     .20  130.00    53.9200    53.5300     .0000      .0000      .0010
  15  S013  S014                     S015          01    .40     .40  120.00    54.7600    54.4000     .0000      .0000      .0010
  16  S014  S015  S013               C016          01    .40     .40   92.00    54.4000    54.1200     .0000      .0000      .0010
  17  S015  C016  S014               B006          01    .40     .40  130.00    54.1200    53.7300     .0000      .0000      .0010
  18  C016  B006  R015  S015         C007          01    .60     .60  182.00    53.3300    52.6100     .0000      .0000      .0010
  19  C003  C024  C002               C025          01    .40     .40  220.00    59.6800    53.0000     .0000      .0000      .0010
  20  C024  C025  C003               C026          01    .40     .40  200.00    52.3100    44.8900     .0000      .0000      .0010
  21  C025  C026  C024               C027          01    .40     .40  180.00    44.8900    38.0000     .0000      .0000      .0010
  22  C026  C027  C025               C032          01    .60     .60  212.00    37.4700    30.0500     .0000      .0000      .0010
  23  C027  C032  C026               C033          01    .60     .60  198.00    29.5900    23.5300     .0000      .0000      .0010
  24  R028  C029                     C030          01    .50     .50  232.00    26.5500    25.7500     .0000      .0000      .0010
  25  C029  C030  R028               C031          01    .60     .60  184.00    25.7500    25.3300     .0000      .0000      .0010
  26  C030  C031  C029               C032          01    .60     .60  167.00    25.3300    24.9100     .0000      .0000      .0010
  27  C031  C032  C011  C030         C033          01    .80     .80  137.00    24.0200    22.6500     .0000      .0000      .0010
  28  C032  C033  C031  C027         C034          01    .80     .80  272.00    22.6500    18.6700     .0000      .0000      .0010
  29  C033  C034  C032               C035          01   1.00    1.00  152.00    18.6700    16.0700     .0000      .0000      .0010
  30  C034  C035  C033               C036          01   1.00    1.00  167.00    16.0700    14.3000     .0000      .0000      .0010
  31  C035  C036  C034               C037          01   1.00    1.00  187.00    14.3000    12.7700     .0000      .0000      .0010
  32  C036  C037  C035               R038          01   1.00    1.00  214.00    12.7700    11.6600     .0000      .0000      .0010
  33  C037  R038  C036               R038          01   1.20    1.20  136.00    11.6600    11.2300     .0000      .0000      .0010
  34  R038  R038  C037               C039          01    .50     .50  100.00    10.4300    10.2700     .0000      .0000      .0010
  35  B038  C039  R038                             01   1.20    1.20  100.00    21.2000    21.1000     .0000      .0000      .0010
```

K N O T E N L O G I K

```
LFN   KN    ZU1  ZU2  ZU3  SZU  AB1  AB2  SAB        LFN   KN    ZU1  ZU2  ZU3  SZU  AB1  AB2  SAB

  1  C001     0    0    0    0    2    0    1         19  S015    18    0    0    1   16    0    1
  2  C002     1    0    0    1    3    0    1         20  C024     3    0    0    1   21    0    1
  3  C003     2    0    0    1    4   20    2         21  C025    20    0    0    1   22    0    1
  4  C004     3    0    0    1    5    0    1         22  C026    21    0    0    1   23    0    1
  5  C005     4    0    0    1    6    0    1         23  C027    22    0    0    1   24    0    1
  6  B006     5   16    0    2    7    0    1         24  C032    23   12    0    2   28    0    1
  7  C007     6    0    0    1    8    0    1         25  R028     0    0    0    0   26    0    1
  8  C008     7    0    0    1    9    0    1         26  C029    25    0    0    1   27    0    1
  9  C009     8    0    0    1   10    0    1         27  C030    26    0    0    1   12    0    1
 10  C010     9    0    0    1   11    0    1         28  C033    24    0    0    1   29    0    1
 11  C011    10    0    0    1   12    0    1         29  C034    28    0    0    1   30    0    1
 12  C031    11   27    0    2   24    0    1         30  C035    29    0    0    1   31    0    1
 13  C013     0    0    0    0   14    0    1         31  C036    30    0    0    1   32    0    1
 14  C014    13    0    0    1   15    0    1         32  C037    31    0    0    1   33    0    1
 15  R015    14    0    0    1   16    0    1         33  R038    32    0    0    1   34    0    1
 16  C016    15   19    0    2    6    0    1         34  B038    33    0    0    1   35    0    1
 17  S013     0    0    0    0   18    0    1         35  C039    34    0    0    1    0    0    0
 18  S014    17    0    0    1   19    0    1
```

```
                                    B E A R B E I T U N G S R E I H E N F O L G E
                                    *********************************************
                                                     (ORIGINAL)
LFN    KN  REIHE   LFN    KN  REIHE   LFN    KN  REIHE   LFN    KN  REIHE   LFN    KN  REIHE   LFN    KN  REIHE

  1  CU01     11     7  C007     17    13  C013      7    19  S015      6    25  RU28      1    31  CU36     31
  2  C002     12     8  C008     18    14  CU14      8    20  C024     23    26  CU29      2    32  CU37     32
  3  C003     13     9  CU09     19    15  R015      9    21  C025     24    27  CU30      3    33  RU38     33
  4  CU04     14    10  C010     20    16  C016     10    22  C026     25    28  CU33     28    34  BU38     34
  5  CU05     15    11  C011     21    17  S013      4    23  C027     26    29  CU34     29    35  C039     35
  6  B006     16    12  CU31     22    18  S014      5    24  C032     27    30  CU35     30    36  0000      0
```

```
                              B E A R B E I T U N G S R E I H E N F O L G E
                              *********************************************
                                         (NACH UMSPEICHERUNG)

LFN    KN  REIHE   LFN    KN  REIHE   LFN    KN  REIHE   LFN    KN  REIHE   LFN    KN  REIHE   LFN    KN  REIHE

 25  HU28      1    13  C013      7     3  C003     13     9  C009     19    22  C026     25    31  CU36     31
 26  CU29      2    14  C014      8     4  C004     14    10  C010     20    23  C027     26    32  CU37     32
 27  CU30      3    15  H015      9     5  C005     15    11  C011     21    24  C032     27    33  R038     33
 17  S013      4    16  C016     10     6  B006     16    12  C031     22    28  CU33     28    34  B038     34
 18  S014      5     1  C001     11     7  C007     17    20  C024     23    29  C034     29    35  C039     35
 19  SU15      6     2  C002     12     8  C008     18    21  C025     24    30  C035     30     0  0000     36

3) SONDERBAUWERKE
-----------------

    KNOTEN = H015   HRUE =    .20 (LFN   1)

    KNOTEN = R038   BRUE =  20.00 (LFN   3)

    KNOTEN = B006   HMAX =   5.00 (LFN   4)

    KNOTEN = B038   HMAX =   5.00 (LFN   5)

    FASSUNGSVERMOEGEN DER RHB    6500.0 CBM

4) STEUERBARE ELEMENTE
----------------------

    LFN TYP KNAB KNGB HMAX   HMIN  QVPRT   CFRG    DQZ    DQA

      1   1    1   29 .160   .150  .0000  .0000  .5000  .1667

                                                ELEMENTANZAHLEN
                                                ***************

                                               ROHRE            35

                                               KNOTEN           35

                                               UEBERLAEUFE       3

                                               BECKEN            2

                                               ROHRVERZWGGN.     1

5) TEILEINZUGSGEBIETSKARTEN
---------------------------

   GEBIET = AC01   TEZ =  26.03 (LFN   1)
GEBIET = AC04   FEZ =  11.65 (LFN   2)

GEBIET = AC05   FEZ =  10.52 (LFN   3)

GEBIET = AC26   FEZ =  20.48 (LFN   7)

GEBIET = AC31   FEZ =  17.83 (LFN   9)

GEBIET = AC32   FEZ =  21.90 (LFN  10)

GEBIET = AC33   FEZ =  14.50 (LFN  11)


                  GEBIETS   FLAECHEN   FLAECHE   BEFESTIGT   BEFESTIGUNGS   EINWOHNER
                    ART      ANZAHL     (HA)       (HA)          GRAD

                     1          1        17.8        5.3          .30          499.
                     2          8       215.0       29.9          .19         6983.
                     3          2       130.0       35.3          .27         1633.
                     4          1        20.5         .4          .02          512.
                  -----------------------------------------------------------------
                  SUMMEN       12       383.3       71.0          .19         9627.
```

```
                                 K N O T E N U E B E R S I C H T
                                 *******************************

KNOTEN  KNTYP  SZU  SAB   TEG   ZN  TYP    FEZ    FEZB     EW   WVBF    IW   IWF

 C001      1     0    1   AC01   1    2   26.03   2.60  2134.   1.00    .0  1.00
 C002      1     1    1
 C003      2     1    2
 C004      1     1    1   AC04   1    2   11.65   2.91  1048.   1.00    .0  1.00
 C005      1     1    1   AC05   1    2   10.52   1.89   600.   1.00    .0  1.00
 B006      4     2    1   AC06   1    2   30.18   6.94   936.   1.00    .0  1.00
 C007      1     1    1
 C008      1     1    1
 C009      1     1    1
 C010      1     1    1
 C011      1     1    1
 C031      1     2    1   AC31   1    1   17.03   5.35   499.   1.00    .0  1.00
 C013      1     0    1   AC13   1    2   50.10   7.01     0.   1.00    .0  1.00
 C014      1     1    1
 R015      3     1    1
 C016      1     2    1
 S013      1     0    1   AS13   1    2   50.10    .00  1303.   1.00    .0  1.00
 S014      1     1    1
 S015      1     1    1
 C024      1     1    1
 C025      1     1    1
 C026      1     1    1   AC26   1    4   20.48    .41   512.   1.00    .0  1.00
 C027      1     1    1
 C032      1     2    1   AC32   1    2   21.90   6.35   701.   1.00    .0  1.00
 R028      3     0    1   AC28   1    3   79.52  31.81  1431.   1.00    .0  1.00
 C029      1     1    1
 C030      1     1    1
 C033      1     1    1   AC33   1    2   14.50   2.17   261.   1.00    .0  1.00
 C034      1     1    1
 C035      1     1    1
 C036      1     1    1
 C037      1     1    1   AC37   1    3   50.52   3.54   202.   1.00    .0  1.00
 R038      3     1    1
 B038      4     1    1
 C039      6     1    0


H) FILE QUANTITAET
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I) PROFILKARTEN
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     GESAMTLAENGE DER KANAELE             6.1  KM

     FASSUNGSVERMOEGEN DER KANAELE     2080.3  CBM
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                                                          R O H R U E B E R S I C H T
                                                          ***************************

  KA    KE    ZU1   ZU2   ZU3   AB1   AB2   PKZ    H      B       F          QV      L        SA       SE        KS

C001  C002                    C003         1     .40    .31    .126       .240  260.00   63.870   60.840    .0010
C002  C003  C001              C004  C024   1     .40    .31    .126       .239  100.00   60.840   59.680    .0010
C003  C004  C002              C005         1     .40    .31    .126       .183  290.00   59.680   57.700    .0010
C004  C005  C003              B006         1     .50    .39    .196       .356  240.00   57.500   55.600    .0010
C005  B006  C004              C007         1    1.00    .79    .785      2.835  145.00   55.400   53.500    .0010
B006  C007  C005  C016        C008         1     .30    .24    .071       .194  185.00   51.390   44.970    .0010
C007  C008  B006              C009         1     .40    .31    .126       .415  250.00   44.970   36.290    .0010
C008  C009  C007              C010         1     .50    .39    .196       .440  225.00   36.290   33.570    .0010
C009  C010  C008              C011         1     .50    .39    .196       .485  184.00   33.570   30.870    .0010
C010  C011  C009              C031         1     .50    .39    .196       .621  172.00   30.870   26.740    .0010
C011  C031  C010              C032         1     .50    .39    .196       .554   92.00   26.740   24.980    .0010
C013  C014                    R015         1    1.00    .79    .785      1.352  120.00   54.760   54.400    .0010
C014  R015  C013              C016         1    1.00    .79    .785      1.362   92.00   54.400   54.120    .0010
R015  C016  C014              B006         1     .20    .16    .031       .019  130.00   53.920   53.530    .0010
S013  S014                    S015         1     .40    .31    .126       .121  120.00   54.760   54.400    .0010
S014  S015  S013              C016         1     .40    .31    .126       .122   92.00   54.400   54.120    .0010
S015  C016  S014              B006         1     .40    .31    .126       .121  130.00   54.120   53.730    .0010
C016  B006  R015  S015        C007         1     .60    .47    .283       .406  182.00   53.330   52.610    .0010
C003  C024  C002              C025         1     .40    .31    .126       .388  220.00   59.680   53.000    .0010
C024  C025  C003              C026         1     .40    .31    .126       .429  200.00   52.310   44.890    .0010
C025  C026  C024              C027         1     .40    .31    .126       .436  180.00   44.890   38.000    .0010
C026  C027  C025              C032         1     .60    .47    .283      1.212  212.00   37.470   30.050    .0010
C027  C032  C026              C033         1     .60    .47    .283      1.133  198.00   29.590   23.530    .0010
R028  C029                    C030         1     .50    .39    .196       .234  232.00   26.550   25.750    .0010
C029  C030  R028              C031         1     .60    .47    .283       .307  184.00   25.750   25.330    .0010
C030  C031  C029              C032         1     .60    .47    .283       .323  167.00   25.330   24.910    .0010
C031  C032  C011  C030        C033         1     .80    .63    .503      1.378  137.00   24.020   22.650    .0010
C032  C033  C027  C031        C034         1     .80    .63    .503      1.668  272.00   22.650   18.670    .0010
C033  C034  C032              C035         1    1.00    .79    .785      3.240  152.00   18.670   16.070    .0010
C034  C035  C033              C036         1    1.00    .79    .785      2.549  167.00   16.070   14.300    .0010
C035  C036  C034              C037         1    1.00    .79    .785      2.238  187.00   14.300   12.770    .0010
C036  C037  C035              R038         1    1.00    .79    .785      1.780  214.00   12.770   11.660    .0010
C037  R038  C036              R038         1    1.20    .94   1.131      2.224  138.00   11.660   11.230    .0010
R038  B038  C037              C039         1     .50    .39    .196       .159  100.00   10.430   10.270    .0010
B038  C039  R038                           1    1.20    .94   1.131      1.255  100.00   21.200   21.100    .0010


2) TEILFUELLUNGSKURVEN FUER BECKEN
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3) GEBIETSBEZEICHNUNGEN
-----------------------


GEBIETSARTEN
                          1    COMMERCIAL

                          2    RESIDENTIAL

                          3    INDUSTRIE
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4   PARKS


4) MULDENKAPAZITAETEN
---------------------

MULDENKAPAZITAETEN (MM)      MB1     MU1      MB2     MU2      MB3     MU3      MB4     MU4

                             .60    10.00     .80    10.00    1.00    12.00     .80    10.00

                             .60    10.00     .80    10.00    1.00    12.00     .80    10.00

5) VERSICKERUNGSRATEN
---------------------

VERSICKERUNG (L/SEC/HA)            REGENMESSREIHE 1                    REGENMESSREIHE 2                    REGENMESSREIHE 3

                         27.7    27.7    27.7    48.6    27.7    27.7    27.7    48.6     .0      .0      .0      .0

6) VERDUNSTUNGSRATEN
--------------------

VERDUNSTUNGSRATEN        GRAD C  MM/TAG  GRAD C  MM/TAG  GRAD C  MM/TAG  GRAD C  MM/TAG  GRAD C  MM/TAG

                            1      .60     11     2.80     21     7.20     31    12.35     41    18.00
                            2      .70     12     3.20     22     7.70     32    12.90     42    18.50
                            3      .97     13     3.60     23     8.20     33    13.40     43    19.00
                            4     1.15     14     4.00     24     8.70     34    13.90     44    19.50
                            5     1.35     15     4.40     25     9.20     35    14.40     45    20.00
                            6     1.55     16     4.80     26     9.75     36    14.90     46    20.50
                            7     1.75     17     5.25     27    10.25     37    15.45     47    21.00
                            8     2.05     18     5.70     28    10.80     38    16.00     48    21.50
                            9     2.30     19     6.20     29    11.30     39    16.50     49    22.00
                           10     2.55     20     6.70     30    11.80     40    17.00     50    22.50

7) MONATSTEMPERATUREN
---------------------

   TEMPERATUREN FUER DIE EINZELEREIGNISRECHNUNG    10.9    19.3    10.9    19.3    10.9    19.3    10.9    19.3

   MESSZEITPUNKTE      37. UND  157. TAGESINTERVALL
```

```
                                   MONATSMITTELTEMPERATUREN
                                   ------------------------

                 1       2       3       4       5       6       7       8       9      10      11      12
      1956      .1      .1     1.5     1.1     7.0    10.9    14.2    11.9     9.5     1.7      .1      .1
               2.4     4.0     7.4     8.6    14.3    19.3    22.7    19.7    15.6     9.7     5.2     3.0
      1960      .1      .1      .1     1.6     5.7    10.7    12.2    11.9    11.7     3.8     2.8     1.2
               3.4     4.0    14.1    12.7    15.9    19.2    18.4    19.2    16.5     9.1     6.4     6.0
      1965      .1      .1      .1     1.5     7.1    11.1    14.0    12.7     7.8     5.9     2.9      .1
               2.0     1.9     2.4     8.3    15.1    18.1    22.1    22.4    15.1     9.5     7.1     1.0

8) EINHEITSGANGLINIEN
---------------------

EINHEITSGANGLINIEN        ZEIT       QB1        QU1        QB2        QU2        QB3        QU3        QB4        QU4

                           5.0    .200000    .064000    .180000    .064000    .200000    .064000    .055000    .064000
                          10.0    .410000    .110000    .370000    .110000    .410000    .110000    .150000    .110000
                          15.0    .222000    .120000    .230000    .120000    .222000    .120000    .240000    .120000
                          20.0    .190000    .118000    .100000    .118000    .190000    .118000    .200000    .118000
                          25.0    .050000    .109000    .060000    .109000    .050000    .109000    .130000    .109000
                          30.0    .030000    .097000    .035000    .097000    .030000    .097000    .090000    .097000
                          35.0    .010000    .082000    .020000    .082000    .010000    .082000    .060000    .082000
                          40.0    .005000    .067000    .010000    .067000    .005000    .067000    .040000    .067000
                          45.0    .000000    .053000    .005000    .053000    .000000    .053000    .030000    .053000
                          50.0    .000000    .043000    .002000    .043000    .000000    .043000    .020000    .043000
                          55.0    .000000    .033000    .000000    .033000    .000000    .033000    .010000    .033000
                          60.0    .000000    .026000    .000000    .026000    .000000    .026000    .005000    .026000
                          65.0    .000000    .020000    .000000    .020000    .000000    .020000    .003000    .020000
                          70.0    .000000    .016000    .000000    .016000    .000000    .016000    .001000    .016000
                          75.0    .000000    .011000    .000000    .011000    .000000    .011000    .000000    .011000
                          80.0    .000000    .009000    .000000    .009000    .000000    .009000    .000000    .009000
                          85.0    .000000    .007000    .000000    .007000    .000000    .007000    .000000    .007000
                          90.0    .000000    .005000    .000000    .005000    .000000    .005000    .000000    .005000
                          95.0    .000000    .004000    .000000    .004000    .000000    .004000    .000000    .004000
                         100.0    .000000    .003000    .000000    .003000    .000000    .003000    .000000    .003000
                         105.0    .000000    .002000    .000000    .002000    .000000    .002000    .000000    .002000
                         110.0    .000000    .001000    .000000    .001000    .000000    .001000    .000000    .001000

9) TW-ABFLUESSE
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TW-ABFLUESSE (L/1000E/S)     ZEIT    WVB     ZEIT    WVB     ZEIT    WVB     ZEIT    WVB     ZEIT    WVB     ZEIT    WVB
 (ORIGINAL)
                              .00   4.050    4.00   4.050    8.00   4.050   12.00   4.050   16.00   4.050   20.00   4.050
                              .05   4.050    4.05   4.050    8.05   4.050   12.05   4.050   16.05   4.050   20.05   4.050
                              .10   4.050    4.10   4.050    8.10   4.050   12.10   4.050   16.10   4.050   20.10   4.050
                              .15   4.050    4.15   4.050    8.15   4.050   12.15   4.050   16.15   4.050   20.15   4.050
                              .20   4.050    4.20   4.050    8.20   4.050   12.20   4.050   16.20   4.050   20.20   4.050
                              .25   4.050    4.25   4.050    8.25   4.050   12.25   4.050   16.25   4.050   20.25   4.050
                              .30   4.050    4.30   4.050    8.30   4.050   12.30   4.050   16.30   4.050   20.30   4.050
                              .35   4.050    4.35   4.050    8.35   4.050   12.35   4.050   16.35   4.050   20.35   4.050
                              .40   4.050    4.40   4.050    8.40   4.050   12.40   4.050   16.40   4.050   20.40   4.050
                              .45   4.050    4.45   4.050    8.45   4.050   12.45   4.050   16.45   4.050   20.45   4.050
                              .50   4.050    4.50   4.050    8.50   4.050   12.50   4.050   16.50   4.050   20.50   4.050
                              .55   4.050    4.55   4.050    8.55   4.050   12.55   4.050   16.55   4.050   20.55   4.050
                             1.00   4.050    5.00   4.050    9.00   4.050   13.00   4.050   17.00   4.050   21.00   4.050
                             1.05   4.050    5.05   4.050    9.05   4.050   13.05   4.050   17.05   4.050   21.05   4.050
                             1.10   4.050    5.10   4.050    9.10   4.050   13.10   4.050   17.10   4.050   21.10   4.050
                             1.15   4.050    5.15   4.050    9.15   4.050   13.15   4.050   17.15   4.050   21.15   4.050
                             1.20   4.050    5.20   4.050    9.20   4.050   13.20   4.050   17.20   4.050   21.20   4.050
                             1.25   4.050    5.25   4.050    9.25   4.050   13.25   4.050   17.25   4.050   21.25   4.050
                             1.30   4.050    5.30   4.050    9.30   4.050   13.30   4.050   17.30   4.050   21.30   4.050
                             1.35   4.050    5.35   4.050    9.35   4.050   13.35   4.050   17.35   4.050   21.35   4.050
                             1.40   4.050    5.40   4.050    9.40   4.050   13.40   4.050   17.40   4.050   21.40   4.050
                             1.45   4.050    5.45   4.050    9.45   4.050   13.45   4.050   17.45   4.050   21.45   4.050
                             1.50   4.050    5.50   4.050    9.50   4.050   13.50   4.050   17.50   4.050   21.50   4.050
                             1.55   4.050    5.55   4.050    9.55   4.050   13.55   4.050   17.55   4.050   21.55   4.050
                             2.00   4.050    6.00   4.050   10.00   4.050   14.00   4.050   18.00   4.050   22.00   4.050
                             2.05   4.050    6.05   4.050   10.05   4.050   14.05   4.050   18.05   4.050   22.05   4.050
                             2.10   4.050    6.10   4.050   10.10   4.050   14.10   4.050   18.10   4.050   22.10   4.050
                             2.15   4.050    6.15   4.050   10.15   4.050   14.15   4.050   18.15   4.050   22.15   4.050
                             2.20   4.050    6.20   4.050   10.20   4.050   14.20   4.050   18.20   4.050   22.20   4.050
                             2.25   4.050    6.25   4.050   10.25   4.050   14.25   4.050   18.25   4.050   22.25   4.050
                             2.30   4.050    6.30   4.050   10.30   4.050   14.30   4.050   18.30   4.050   22.30   4.050
                             2.35   4.050    6.35   4.050   10.35   4.050   14.35   4.050   18.35   4.050   22.35   4.050
                             2.40   4.050    6.40   4.050   10.40   4.050   14.40   4.050   18.40   4.050   22.40   4.050
                             2.45   4.050    6.45   4.050   10.45   4.050   14.45   4.050   18.45   4.050   22.45   4.050
                             2.50   4.050    6.50   4.050   10.50   4.050   14.50   4.050   18.50   4.050   22.50   4.050
                             2.55   4.050    6.55   4.050   10.55   4.050   14.55   4.050   18.55   4.050   22.55   4.050
                             3.00   4.050    7.00   4.050   11.00   4.050   15.00   4.050   19.00   4.050   23.00   4.050
                             3.05   4.050    7.05   4.050   11.05   4.050   15.05   4.050   19.05   4.050   23.05   4.050
                             3.10   4.050    7.10   4.050   11.10   4.050   15.10   4.050   19.10   4.050   23.10   4.050
                             3.15   4.050    7.15   4.050   11.15   4.050   15.15   4.050   19.15   4.050   23.15   4.050
                             3.20   4.050    7.20   4.050   11.20   4.050   15.20   4.050   19.20   4.050   23.20   4.050
                             3.25   4.050    7.25   4.050   11.25   4.050   15.25   4.050   19.25   4.050   23.25   4.050
                             3.30   4.050    7.30   4.050   11.30   4.050   15.30   4.050   19.30   4.050   23.30   4.050
                             3.35   4.050    7.35   4.050   11.35   4.050   15.35   4.050   19.35   4.050   23.35   4.050
                             3.40   4.050    7.40   4.050   11.40   4.050   15.40   4.050   19.40   4.050   23.40   4.050
                             3.45   4.050    7.45   4.050   11.45   4.050   15.45   4.050   19.45   4.050   23.45   4.050
                             3.50   4.050    7.50   4.050   11.50   4.050   15.50   4.050   19.50   4.050   23.50   4.050
                             3.55   4.050    7.55   4.050   11.55   4.050   15.55   4.050   19.55   4.050   23.55   4.050
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TW-ABFLUESSE (L/1000E/S)       ZEIT     QVB    ZEIT     QVB    ZEIT     QVB    ZEIT     QVB    ZEIT     QVB    ZEIT     QVB
(MIT QVBF = 1.00)
                                .00   4.050    4.00   4.050    8.00   4.050   12.00   4.050   16.00   4.050   20.00   4.050
                                .05   4.050    4.05   4.050    8.05   4.050   12.05   4.050   16.05   4.050   20.05   4.050
                                .10   4.050    4.10   4.050    8.10   4.050   12.10   4.050   16.10   4.050   20.10   4.050
                                .15   4.050    4.15   4.050    8.15   4.050   12.15   4.050   16.15   4.050   20.15   4.050
                                .20   4.050    4.20   4.050    8.20   4.050   12.20   4.050   16.20   4.050   20.20   4.050
                                .25   4.050    4.25   4.050    8.25   4.050   12.25   4.050   16.25   4.050   20.25   4.050
                                .30   4.050    4.30   4.050    8.30   4.050   12.30   4.050   16.30   4.050   20.30   4.050
                                .35   4.050    4.35   4.050    8.35   4.050   12.35   4.050   16.35   4.050   20.35   4.050
                                .40   4.050    4.40   4.050    8.40   4.050   12.40   4.050   16.40   4.050   20.40   4.050
                                .45   4.050    4.45   4.050    8.45   4.050   12.45   4.050   16.45   4.050   20.45   4.050
                                .50   4.050    4.50   4.050    8.50   4.050   12.50   4.050   16.50   4.050   20.50   4.050
                                .55   4.050    4.55   4.050    8.55   4.050   12.55   4.050   16.55   4.050   20.55   4.050
                               1.00   4.050    5.00   4.050    9.00   4.050   13.00   4.050   17.00   4.050   21.00   4.050
                               1.05   4.050    5.05   4.050    9.05   4.050   13.05   4.050   17.05   4.050   21.05   4.050
                               1.10   4.050    5.10   4.050    9.10   4.050   13.10   4.050   17.10   4.050   21.10   4.050
                               1.15   4.050    5.15   4.050    9.15   4.050   13.15   4.050   17.15   4.050   21.15   4.050
                               1.20   4.050    5.20   4.050    9.20   4.050   13.20   4.050   17.20   4.050   21.20   4.050
                               1.25   4.050    5.25   4.050    9.25   4.050   13.25   4.050   17.25   4.050   21.25   4.050
                               1.30   4.050    5.30   4.050    9.30   4.050   13.30   4.050   17.30   4.050   21.30   4.050
                               1.35   4.050    5.35   4.050    9.35   4.050   13.35   4.050   17.35   4.050   21.35   4.050
                               1.40   4.050    5.40   4.050    9.40   4.050   13.40   4.050   17.40   4.050   21.40   4.050
                               1.45   4.050    5.45   4.050    9.45   4.050   13.45   4.050   17.45   4.050   21.45   4.050
                               1.50   4.050    5.50   4.050    9.50   4.050   13.50   4.050   17.50   4.050   21.50   4.050
                               1.55   4.050    5.55   4.050    9.55   4.050   13.55   4.050   17.55   4.050   21.55   4.050
                               2.00   4.050    6.00   4.050   10.00   4.050   14.00   4.050   18.00   4.050   22.00   4.050
                               2.05   4.050    6.05   4.050   10.05   4.050   14.05   4.050   18.05   4.050   22.05   4.050
                               2.10   4.050    6.10   4.050   10.10   4.050   14.10   4.050   18.10   4.050   22.10   4.050
                               2.15   4.050    6.15   4.050   10.15   4.050   14.15   4.050   18.15   4.050   22.15   4.050
                               2.20   4.050    6.20   4.050   10.20   4.050   14.20   4.050   18.20   4.050   22.20   4.050
                               2.25   4.050    6.25   4.050   10.25   4.050   14.25   4.050   18.25   4.050   22.25   4.050
                               2.30   4.050    6.30   4.050   10.30   4.050   14.30   4.050   18.30   4.050   22.30   4.050
                               2.35   4.050    6.35   4.050   10.35   4.050   14.35   4.050   18.35   4.050   22.35   4.050
                               2.40   4.050    6.40   4.050   10.40   4.050   14.40   4.050   18.40   4.050   22.40   4.050
                               2.45   4.050    6.45   4.050   10.45   4.050   14.45   4.050   18.45   4.050   22.45   4.050
                               2.50   4.050    6.50   4.050   10.50   4.050   14.50   4.050   18.50   4.050   22.50   4.050
                               2.55   4.050    6.55   4.050   10.55   4.050   14.55   4.050   18.55   4.050   22.55   4.050
                               3.00   4.050    7.00   4.050   11.00   4.050   15.00   4.050   19.00   4.050   23.00   4.050
                               3.05   4.050    7.05   4.050   11.05   4.050   15.05   4.050   19.05   4.050   23.05   4.050
                               3.10   4.050    7.10   4.050   11.10   4.050   15.10   4.050   19.10   4.050   23.10   4.050
                               3.15   4.050    7.15   4.050   11.15   4.050   15.15   4.050   19.15   4.050   23.15   4.050
                               3.20   4.050    7.20   4.050   11.20   4.050   15.20   4.050   19.20   4.050   23.20   4.050
                               3.25   4.050    7.25   4.050   11.25   4.050   15.25   4.050   19.25   4.050   23.25   4.050
                               3.30   4.050    7.30   4.050   11.30   4.050   15.30   4.050   19.30   4.050   23.30   4.050
                               3.35   4.050    7.35   4.050   11.35   4.050   15.35   4.050   19.35   4.050   23.35   4.050
                               3.40   4.050    7.40   4.050   11.40   4.050   15.40   4.050   19.40   4.050   23.40   4.050
                               3.45   4.050    7.45   4.050   11.45   4.050   15.45   4.050   19.45   4.050   23.45   4.050
                               3.50   4.050    7.50   4.050   11.50   4.050   15.50   4.050   19.50   4.050   23.50   4.050
                               3.55   4.050    7.55   4.050   11.55   4.050   15.55   4.050   19.55   4.050   23.55   4.050


(G) TW-ABFLUESSE
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(G) SPEZIELLE INTERESANTE KNOTEN
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I1) KONSTANTE UEBERNAHMEN
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I2) VARIABLE UEBERNAHMEN
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C) FILE QUALITAET
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1) SCHMUTZSTOFFBEZEICHNUNGEN
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SCHMUTZSTOFFE            1  0   B.O.D.

                         2  0   T.S.S.

                         3 12   FECAL COLIFORM

                         4  0   COD

SCHMUTZSTOFFAKTOREN 10**X     .1+01     .1+01     .1+13     .1+01

SCHMUTZSTOFFAKTOREN 10**Y     .1+01     .1+01     .1+10     .1+01

2) SCHMUTZMENGEN
----------------

SCHMUTZA.            SCHMUTZSTOFF 1 (KG/HA)      SCHMUTZSTOFF 2 (KG/HA)      SCHMUTZSTOFF 3 (ANZ/L)      SCHMUTZSTOFF 4 (KG/HA)
                    10.0   15.0   20.0   15.0   75.0   80.0  110.0   80.0  100.0  100.0  100.0  100.0   50.0   60.0   70.0   60.0
                    10.0   15.0   20.0   15.0   75.0   80.0  110.0   80.0  100.0  100.0  100.0  100.0   50.0   60.0   70.0   60.0
    SCHMUTZSTOFF 3   GEBIETSART 1   AUFBAUZEIT =   24 STUNDEN
    SCHMUTZSTOFF 3   GEBIETSART 2   AUFBAUZEIT =   24 STUNDEN
    SCHMUTZSTOFF 3   GEBIETSART 3   AUFBAUZEIT =   24 STUNDEN
    SCHMUTZSTOFF 3   GEBIETSART 4   AUFBAUZEIT =   24 STUNDEN
AUFBAUZEITEN (STD)          SCHMUTZSTOFF 1             SCHMUTZSTOFF 2             SCHMUTZSTOFF 3             SCHMUTZSTOFF 4
                    240    240    240    240    720    720    720    720     24     24     24     24    240    240    240    240
    TURNUS DER STRASSENREINIGUNG = 168 STUNDEN
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      LETZTE STRASSENREINIGUNG VOR  84 STUNDEN

STRASSENREINIGUNG          SCHMUTZSTOFF 1              SCHMUTZSTOFF 2              SCHMUTZSTOFF 3              SCHMUTZSTOFF 4

                   5.    35.    35.     5.    10.    40.    40.    10.     8.    30.    30.     8.     5.    35.    35.     5.

3) EINHEITSGANGLINIEN
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EINHEITSGANGLINIEN           ZEIT           SCHMUTZSTOFF 1                              SCHMUTZSTOFF 2

                              5.0   4.100000   3.080000   3.080000   4.100000   5.100000   3.830000   7.650000   5.100000
                             10.0   4.280000   3.210000   3.210000   4.280000   7.150000   5.360000  10.730000   7.150000
                             15.0   2.000000   1.500000   1.500000   2.000000   3.510000   2.630000   5.270000   3.510000
                             20.0   1.030000    .770000    .770000   1.030000   2.050000   1.540000   3.080000   2.050000
                             25.0    .650000    .490000    .490000    .650000   1.350000   1.010000   2.030000   1.350000
                             30.0    .370000    .280000    .280000    .370000    .900000    .680000   1.350000    .900000
                             35.0    .190000    .140000    .140000    .190000    .600000    .450000    .900000    .600000
                             40.0    .040000    .030000    .030000    .040000    .350000    .260000    .530000    .350000
                             45.0    .000000    .000000    .000000    .000000    .200000    .150000    .300000    .200000
                             50.0    .000000    .000000    .000000    .000000    .090000    .070000    .140000    .090000
                             55.0    .000000    .000000    .000000    .000000    .020000    .020000    .030000    .020000
EINHEITSGANGLINIEN           ZEIT           SCHMUTZSTOFF 3                              SCHMUTZSTOFF 4

                              5.0  15.000000  15.000000   7.500000  15.000000  15.400000  15.400000  15.400000  15.400000
                             10.0  39.500000  39.500000  19.750000  39.500000  16.050000  16.050000  16.050000  16.050000
                             15.0  30.000000  30.000000  15.000000  30.000000   7.500000   7.500000   7.500000   7.500000
                             20.0  19.000000  19.000000   9.500000  19.000000   3.850000   3.850000   3.850000   3.850000
                             25.0  10.000000  10.000000   5.000000  10.000000   2.450000   2.450000   2.450000   2.450000
                             30.0   5.500000   5.500000   2.750000   5.500000   1.400000   1.400000   1.400000   1.400000
                             35.0   3.500000   3.500000   1.750000   3.500000    .700000    .700000    .700000    .700000
                             40.0   2.000000   2.000000   1.000000   2.000000    .150000    .150000    .150000    .150000
                             45.0   1.500000   1.500000    .750000   1.500000    .000000    .000000    .000000    .000000
                             50.0   1.000000   1.000000    .500000   1.000000    .000000    .000000    .000000    .000000
                             55.0    .500000    .500000    .250000    .500000    .000000    .000000    .000000    .000000

4) EINFLUSSFAKTOREN
-------------------

GEBIETSFAKTOREN            SCHMUTZSTOFF 1              SCHMUTZSTOFF 2              SCHMUTZSTOFF 3              SCHMUTZSTOFF 4

                 1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00
REGENDAUEREINFLUSS   ZEIT          SCHMUTZSTOFF 1              SCHMUTZSTOFF 2              SCHMUTZSTOFF 3              SCHMUTZSTOFF 4

                      5.0   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00
                     10.0   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00    .94    .91    .91    .94   1.00   1.00   1.00   1.00
                     15.0    .98    .96    .96    .98    .99    .99    .99   1.00    .88    .83    .83    .88    .98    .96    .96    .98
                     20.0    .90    .87    .87    .90    .98    .98    .98    .99    .80    .75    .75    .80    .90    .87    .87    .90
                     25.0    .76    .70    .73    .77    .97    .95    .96    .98    .73    .66    .67    .73    .76    .70    .73    .77
                     30.0    .69    .55    .58    .67    .93    .88    .90    .95    .67    .58    .60    .67    .64    .55    .58    .67
                     35.0    .55    .45    .49    .59    .87    .79    .83    .90    .60    .51    .53    .60    .55    .45    .49    .59
                     40.0    .48    .38    .42    .55    .78    .66    .72    .84    .54    .43    .46    .54    .48    .38    .42    .55
                     45.0    .43    .33    .37    .51    .69    .55    .61    .76    .48    .37    .41    .48    .43    .33    .37    .51
                     50.0    .38    .29    .33    .48    .59    .45    .52    .66    .44    .31    .36    .44    .38    .29    .33    .48
                     55.0    .35    .27    .31    .46    .53    .39    .46    .59    .39    .28    .32    .39    .35    .27    .31    .46
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                         60.0   .33  .25  .29  .44  .48  .35  .42  .54  .36  .23  .28  .36  .33  .25  .29  .44
                         65.0   .32  .23  .28  .43  .44  .32  .39  .49  .33  .22  .26  .33  .32  .23  .28  .43
                         70.0   .31  .22  .27  .42  .42  .31  .37  .47  .32  .21  .25  .32  .31  .22  .27  .42
                         75.0   .30  .21  .26  .41  .41  .31  .36  .46  .31  .20  .24  .31  .30  .21  .26  .41
                         80.0   .30  .20  .25  .40  .40  .30  .35  .40  .30  .20  .23  .30  .30  .20  .25  .40
                         85.0   .30  .20  .25  .40  .40  .30  .35  .40  .30  .20  .23  .30  .30  .20  .25  .40
                         90.0   .30  .20  .25  .40  .40  .30  .35  .40  .30  .20  .23  .30  .30  .20  .25  .40
                         95.0   .30  .20  .25  .40  .40  .30  .35  .40  .30  .20  .23  .30  .30  .20  .25  .40
                        100.0   .30  .20  .25  .40  .40  .30  .35  .40  .30  .20  .23  .30  .30  .20  .25  .40

TAGESZEITEINFLUSS              ZEIT      1       2       3       4          ZEIT      1       2       3       4

                                .00     .80     .80    1.00     .80         12.00    1.00    1.00     .60    1.00
                                .30     .80     .80    1.00     .80         12.30    1.00    1.00     .57    1.00
                               1.00     .80     .80    1.00     .80         13.00    1.00    1.00     .55    1.00
                               1.30     .80     .80    1.00     .80         13.30    1.00    1.00     .55    1.00
                               2.00     .80     .80    1.00     .80         14.00     .99     .99     .55     .99
                               2.30     .80     .80    1.00     .80         14.30     .98     .98     .60     .98
                               3.00     .80     .80    1.00     .80         15.00     .97     .97     .65     .97
                               3.30     .80     .80    1.00     .80         15.30     .98     .98     .70     .98
                               4.00     .82     .82    1.00     .82         16.00     .99     .99     .80     .99
                               4.30     .84     .84    1.00     .84         16.30    1.00    1.00     .90    1.00
                               5.00     .86     .86    1.00     .86         17.00    1.00    1.00    1.00    1.00
                               5.30     .89     .89    1.00     .89         17.30    1.00    1.00    1.00    1.00
                               6.00     .92     .92    1.00     .92         18.00    1.00    1.00    1.00    1.00
                               6.30     .95     .95    1.00     .95         18.30    1.00    1.00    1.00    1.00
                               7.00    1.00    1.00    1.00    1.00         19.00     .98     .98    1.00     .98
                               7.30    1.00    1.00    1.00    1.00         19.30     .96     .96    1.00     .96
                               8.00    1.00    1.00     .95    1.00         20.00     .94     .94    1.00     .94
                               8.30    1.00    1.00     .90    1.00         20.30     .92     .92    1.00     .92
                               9.00     .99     .99     .85     .99         21.00     .90     .90    1.00     .90
                               9.30     .98     .98     .80     .98         21.30     .88     .88    1.00     .88
                              10.00     .97     .97     .75     .97         22.00     .86     .86    1.00     .86
                              10.30     .98     .98     .70     .98         22.30     .84     .84    1.00     .84
                              11.00     .99     .99     .65     .99         23.00     .82     .82    1.00     .82
                              11.30    1.00    1.00     .60    1.00         23.30     .80     .80    1.00     .80

JAHRESZEITEINFLUSS                1      2      3      4      5      6      7      8      9     10     11     12

                         1      .80    .75    .80    .90    .87    .80    .75    .75    .82    .93   1.00    .98

                         2      .99   1.00    .94    .84    .80    .80    .80    .80    .80    .80    .84    .92

                         3      .40    .42    .46    .60    .82    .94    .99   1.00    .96    .77    .55    .43

                         4      .80    .75    .80    .90    .87    .80    .75    .75    .82    .93   1.00    .98
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BECKENKLAERWIRKUNG              BECKEN IM NETZ                                 KLAERWERKSBECKEN
  (IN PROZENT)      ZEIT    1     2     3     4                 ZEIT    1     2     3     4

                      5.   86.   68.   99.   86.                   .5   86.   68.   98.   86.
                     10.   81.   45.   99.   81.                  1.0   78.   48.   97.   78.
                     15.   78.   42.   98.   78.                  1.5   74.   42.   95.   74.
                     20.   76.   40.   98.   76.                  2.0   68.   38.   95.   68.
                     25.   75.   39.   97.   75.                  2.5   66.   35.   93.   66.
                     30.   74.   38.   97.   74.                  3.0   64.   33.   92.   64.
                     35.   73.   37.   97.   73.                  3.5   62.   32.   91.   62.
                     40.   73.   36.   96.   73.                  4.0   61.   31.   90.   61.
                     45.   72.   36.   96.   72.                  4.5   60.   31.   89.   60.
                     50.   72.   35.   96.   72.                  5.0   59.   30.   88.   59.
                     55.   72.   35.   95.   72.                  5.5   58.   30.   87.   58.
                     60.   71.   34.   95.   71.                  6.0   58.   30.   86.   58.
                     65.   71.   34.   95.   71.                  6.5   58.   30.   85.   58.
                     70.   71.   33.   95.   71.                  7.0   58.   30.   84.   58.
                     75.   70.   33.   94.   70.                  7.5   58.   30.   84.   58.
                     80.   70.   33.   94.   70.                  8.0   58.   30.   83.   58.
                     85.   70.   33.   94.   70.                  8.5   58.   30.   83.   58.
                     90.   69.   32.   94.   69.                  9.0   58.   30.   82.   58.
                     95.   69.   32.   94.   69.                  9.5   58.   30.   81.   58.
                    100.   69.   32.   93.   69.                 10.0   58.   30.   80.   58.
                    105.   69.   32.   93.   69.                 10.5   58.   30.   79.   58.
                    110.   68.   31.   93.   68.                 11.0   58.   30.   79.   58.
                    115.   68.   31.   93.   68.                 11.5   58.   30.   78.   58.
                    120.   68.   31.   92.   68.                 12.0   58.   30.   78.   58.
                    125.   68.   31.   92.   68.                 12.5   58.   30.   77.   58.
                    130.   67.   31.   92.   67.                 13.0   58.   30.   77.   58.
                    135.   67.   31.   92.   67.                 13.5   58.   30.   76.   58.
                    140.   67.   31.   92.   67.                 14.0   58.   30.   75.   58.
                    145.   67.   31.   92.   67.                 14.5   58.   30.   75.   58.
                    150.   67.   31.   91.   67.                 15.0   58.   30.   75.   58.
                    155.   66.   31.   91.   66.                 15.5   58.   30.   74.   58.
                    160.   66.   31.   91.   66.                 16.0   58.   30.   74.   58.
                    165.   66.   31.   91.   66.                 16.5   58.   30.   73.   58.
                    170.   66.   31.   91.   66.                 17.0   58.   30.   73.   58.
                    175.   66.   31.   91.   66.                 17.5   58.   30.   72.   58.
                    180.   65.   30.   91.   65.                 18.0   58.   30.   72.   58.
                    185.   65.   30.   90.   65.                 18.5   58.   30.   71.   58.
                    190.   65.   30.   90.   65.                 19.0   58.   30.   71.   58.
                    195.   65.   30.   90.   65.                 19.5   58.   30.   70.   58.
                    200.   65.   30.   90.   65.                 20.0   58.   30.   70.   58.
                    205.   65.   30.   90.   65.                 20.5   58.   30.   70.   58.
                    210.   65.   30.   90.   65.                 21.0   58.   30.   70.   58.
                    215.   65.   30.   90.   65.                 21.5   58.   30.   70.   58.
                    220.   65.   30.   90.   65.                 22.0   58.   30.   70.   58.
                    225.   65.   30.   89.   65.                 22.5   58.   30.   70.   58.
                    230.   65.   30.   89.   65.                 23.0   58.   30.   70.   58.
                    235.   65.   30.   89.   65.                 23.5   58.   30.   70.   58.
                    240.   65.   30.   89.   65.                 24.0   58.   30.   70.   58.
                    245.   65.   30.   89.   65.
                    250.   65.   30.   89.   65.
                    255.   65.   30.   89.   65.
                    260.   65.   30.   89.   65.
                    265.   65.   30.   89.   65.
                    270.   65.   30.   88.   65.
                    275.   65.   30.   88.   65.
                    280.   65.   30.   88.   65.
                    285.   65.   30.   88.   65.
                    290.   65.   30.   88.   65.
                    295.   65.   30.   88.   65.
                    300.   65.   30.   88.   65.
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5) TW-SCHMUTZMENGEN
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TW-SCHMUTZ   ZEIT              SCHMUTZSTOFF 1                     SCHMUTZSTOFF 2                  SCHMUTZSTOFF 3                    SCHMUTZSTOFF 4
(G/1000E/S)

               .00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
               .30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
              1.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
              1.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
              2.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
              2.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
              3.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
              3.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
              4.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
              4.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
              5.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
              5.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
              6.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
              6.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
              7.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
              7.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
              8.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
              8.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
              9.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
              9.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             10.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             10.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             11.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             11.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             12.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             12.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             13.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             13.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             14.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             14.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             15.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             15.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             16.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             16.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             17.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             17.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             18.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             18.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             19.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             19.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             20.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             20.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             21.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             21.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             22.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             22.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             23.00  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
             23.30  250.00 250.00 250.00 250.00 280.00 280.00 280.00 280.00  20.00  20.00  20.00  20.00 360.00 360.00 360.00 360.00
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replace by:
mg/l or ppm

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IW-SCHMUTZ   ZEIT            SCHMUTZSTOFF 1              SCHMUTZSTOFF 2              SCHMUTZSTOFF 3              SCHMUTZSTOFF 4
(G/1000E/S)                   (SMF1 = 1.00)               (SMF2 = 1.00)               (SMF3 = 1.00)               (SMF4 = 1.00)

               .00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
               .30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
              1.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
              1.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
              2.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
              2.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
              3.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
              3.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
              4.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
              4.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
              5.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
              5.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
              6.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
              6.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
              7.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
              7.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
              8.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
              8.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
              9.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
              9.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             10.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             10.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             11.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             11.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             12.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             12.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             13.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             13.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             14.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             14.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             15.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             15.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             16.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             16.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             17.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             17.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             18.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             18.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             19.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             19.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             20.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             20.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             21.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             21.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             22.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             22.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             23.00    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46
             23.30    1.01   1.01   1.01   1.01   1.13   1.13   1.13   1.13  81.00  81.00  81.00  81.00   1.46   1.46   1.46   1.46


6) IW-KONZENTRATIONEN
---------------------

     IWKZ1 =270.0000  IWKZ2 =250.0000  IWKZ3 = 20.0300  IWKZ4 = 60.0000
```

5

```
8) KONSTANTE UEBERNAHMEN
------------------------


9) VARIABLE UEBERNAHMEN
-----------------------

@BRKPT  PRINT$
```

6

Input data for continuous simulation

Precipitation data

```
QQS-EPA-EXAMPLE
 56 60
 6 7 8                                                                            5.00
0 56  1  1  0  0      1     37343
1 56 05 10 15 55    192         4
  400 2500  200  100
0 56 05 10 16 15    196         2
1 56 05 10 16 25    198        16
  200 1100  800  500     0  200  200  100  200  300  200  200  200  300  400  100
0 56 05 10 17 45    214       277
1 56 05 11 16 50    203         3
  900  600  200
0 56 05 11 17  5    206      1550
1 56 05 17  2 15     28         3
 1400  100  100
0 56 05 17  2 30     31        25
1 56 05 17  4 35     56        11
  300 1800  200  100  400  300  200  300  200  300  300
0 56 05 17  5 30     67      1783
1 56 05 23 10  5    122         2
 1100  200
0 56 05 23 10 15    124       376
1 56 05 24 17 35    212         6
 3800 1000  800  100     0  100
0 56 05 24 18  5    218      1493
1 56 05 29 22 30  . 271         5
  700 1900  500  100  300
0 56 05 29 22 55    276       240
1 56 05 30 18 55    228         6
  600 5900  500  500  100  100
0 56 05 30 19 25    234      1722
1 56 06 05 18 55    228         4
 1800 2600 3600 1200
0 56 06 05 19 15    232       579
1 56 06 07 19 30    235         4
  100    0  700 6400
0 56 06 07 19 50    239        41
1 56 06 07 23 15    280        75
  700  400  100    0  100    0  100    0  100    0  100    0    0  100    0  300
  200  100  100  200  400  200  200  200  600  500  100  100   20   30   20   30
   20   30   30   20   20   20   30   20   30   20   20   20   20   30   20   30
   20   30   20   20   20   20   30   20   30   20   20   20   20   30   20   30
   30   20   30   20   30   20  100    0  100    0  100
0 56 06 08  5 30     67      1014
1 56 06 11 18  0    217        13
  800 3200 2800  500  400  800  200  200  200  200  300  100  100
0 56 06 11 19  5    230      3053
1 56 06 22  9 30    115         6
  900  200    0  100    0  100
0 56 06 22 10  0    121      1464
1 56 06 27 12  0    145        11
  100  200  500  800  600  200  200  400  500  300  300
0 56 06 27 12 55    156        45
1 56 06 27 16 40    201         9
  600 1400  200    0  100    0  100  500  100
0 56 06 27 17 25    210        99
1 56 06 28  1 40     21         8
  700  400  400  200  300  100  300  100
0 56 06 28  2 20     29       402
1 56 06 29 11 50    143         4
  600  400  100  100
0 56 06 29 12 10    147       645
1 56 07 01 17 55    216        51
  100    0  100  100  100  100     0  100  100  300  800 1000  300  200  100  300
  200  400  300  400  400  300  300  200  400  700  400  500  500  500  200  300
  200  400  200  300  300  300  100  300  100    0   70   70   70   70   70   70
   70    0  100
0 56 07 01 22 10   267       236
1 56 07 02 17 50   215        28
  500  200  600 2200 2800 2600  500  900  200  400  500   40   40   40   40   40
   20   20   30   30  600  100  100  200  400  200  200  100
0 56 07 02 20 10   243      2332
1 56 07 10 22 30   271        45
  200 3600 5200 4400 2600 2700 1500  600  400  300  300  200  500  400  600  800
  300  600  300  100  200  100  100  100  400  100  400  300  400  400  300  300
  500  500  600  600  600  400  300  200  200  100    0    0  100
0 56 07 11  2 15    28       110
1 56 07 11 11 25   138        66
  100  100  100  100  100  100  100   70   70   70   70   70   70  100  100  200
  210  210  210  210  210  210  210  200  100  100  100  100  100  100  100  100
  100  100  100  100  100  100  100  100  100    0    0  100    0  100    0  100
   20   20   20   20   20  300  200  200  100  100  200  100  200  100    0    0
    0  100
0 56 07 11 16 55   204       805
1 56 07 14 12  0   145         5
 2300 1400  500  100  100
0 56 07 14 12 25   150       588
1 56 07 16 13 25   162         7
 4000  800    0  100    0  300  300
0 56 07 16 14  0   169        29
1 56 07 16 16 25   198        14
 1800  400    0  200  100  100 1200 1200 2300 1100 1100 1000  800  100
0 56 07 16 17 35   212       862
1 56 07 19 17 25   210        32
 4100 1400  800  700  400  300  300  300  300  500  300  100  300  300  300  300
  300  300  300  200  200  200  100  100  100  200  200  100  100    0    0  100
0 56 07 19 20  5   242       569
1 56 07 21 19 30   235         6
  700  900  300  100  100  100
0 56 07 21 20  0   241      1516
1 56 07 27  2 20    29         3
 1100  700  200
0 56 07 27  2 35    32        10
1 56 07 27  3 25    42         4
 7000 1300  100  100
0 56 07 27  3 45    46       447
1 56 07 28 17  0   205         8
  900 1600  500  400  300  200  100  100
0 56 07 28 17 40   213       265
1 56 07 29 15 45   190         7
  500 3000  200    0  100    0  100
0 56 07 29 16 20   197        46
1 56 07 29 20 10   243        47
  400  400  300  200  100  100    0  200  200  100  300  200  100  200  100  100
    0  100    0  100  100  100  100  100  100  200  200  100  300  200    0  200
  200  100  200  100  100    0  100    0  100    0    0  100  100  100  100
0 56 07 30  0  5     2        34
1 56 07 30  2 55    36         3
 1900  600  400
0 56 07 30  3 10    39      1009
1 56 08 02 15 15   184         5
 2200  100    0  400  300
0 56 08 02 15 40   189       211
1 56 08 03  9 15   112         3
  300  800  300
0 56 08 03  9 30   115      1918
1 56 08 10  1 20    17        17
  100  200  200  100 2100 1600  600  800  500  400  400  200  500  400  300  400
```

```
   100
0 56 08 10  2 45     34      1337
1 56 08 14 18 10    219        11
   500   100   700  1400   600   200   200     0   300   100   100
0 56 08 14 19  5    230       904
1 56 08 17 22 25    270         4
  2100   100     0   100
0 56 08 17 22 45    274      1010
1 56 08 21 10 55    132        12
  1300   500   200   400   200   300   300     0   100   100   100   100
0 56 08 21 11 55    144      1168
1 56 08 25 13 15    160         9
   100   200   100   600   800  1300  1400   400   100
0 56 08 25 14  0    169      1203
1 56 08 29 18 15    220        52
   100     0   300   500   300   500   300   300   300   400   500   500   300   400   300   300
   300   100   300   200   200   300   300   300   300   300   300   200   400   200   100   100
   200   200   100   100   100   200   200   400   200   300   200   100   100   100     0   100
     0     0     0   100
0 56 08 29 22 35    272      3093
1 56 09 09 16 20    197         2
   400  2500
0 56 09 09 16 30    199       319
1 56 09 10 19  5    230        30
   100   100   100   100   100   300   100   100   100   200   200   200   400   300   300   400
   200   200   200   100     0   200     0   100     0   200   200   200   200   200
0 56 09 10 21 35    260       469
1 56 09 12 12 40    153         3
  1100  2000   100
0 56 09 12 12 55    156       342
1 56 09 13 17 25    210        47
   100     0     0     0   100     0   100   100     0   100     0     0   100   400   200   200
   200   200   100   100   200   100   100   100   100   200   200   200   300  1200   200   100
     0   100     0    40    40    40    40    40    40    40    40    40    40    40   100
0 56 09 13 21 20    257      3969
1 56 09 27 16  5    194        53
   100     0   100   100   100   100   100   100   100   100   200   200   100   100   100     0
   200    60    60    60    60    60    60    60    60   200   100     0   200   400   400   300
   200   200   300   300   200   100   100   100   100   100   200     0   100     0     0    20
    20    20    20    10    10
0 56  9 27 20 30    247     62184
1 60 05 01 18 30    223         2
   500   700
0 60 05 01 18 40    225      3459
1 60 05 13 18 55    228         5
   500   800   100    50    50
0 60 05 13 19 20    233       232
1 60 05 14 14 40    177        26
    40    40    40    40    40    50   150   200   300   300   400   300   200   300   200   150
   150   300   400    50    50   100   100   100   200    50
0 60 05 14 16 50    203       622
1 60 05 16 20 40    249        35
   100   100   100   100   100   100   100   100   100   200   100   200   300   300   200   200
   300   500   600   200   100    50    50   100   100   100   100   100   100   400   400   300
   300   100   100
0 60 05 16 23 35    284      1559
1 60 05 22  9 30    115       128
    30    30    30    30    50    50    50    50    50    50   100   100   200   200   100   200
   300   100   200   300   300   400   500   300   100   100   200   200   150   150   150   150
   100   100   100   100    50    50    50    50    50    50    50    50    50    50    50    50
    80    80    80    80    80    80   100   200   100     0   100   400   300   500   200   400
   200   200   100   100   100   100   100   100   200   200   100   100   100   100   100   100
   100   100   100     0   200   150   150   100   100   100   100   200   300   500   200   200
   100   200   200   300   700   700   800   500   400   200   200   200    30    30    30    20
   20   20   20   10   10   30   30   30   30   30   30   30   30   30   10   10
0 60 05 22 20 10   243       541
1 60 05 24 17 15   208        66
 1100  250  250  200  100  100   60   70   70   30   30   30  100  100  200  100
  100  100   50   50  100  100  100   50   50  100  100  100  100  100  100   50
  150  900  700  400  200  300  200  150  150  100  100   50   50   50   50  100
  100   50   50   40   40   40   40   40   50   50  200  100  100   30   30   30
  150   50
0 60 05 24 22 45   274      1363
1 60 05 29 16 20   197        19
 7900 1100  400  300  200  200  200  100  100   50   50   50   50   30   30   30
   30   30   30
0 60 05 29 17 55   216      3003
1 60 06 09  4 10    51         7
  800 1500  600  100  100  200  100
0 60 06 09  4 45    58       412
1 60 06 10 15  5   182        11
 1100 1900  300  300    0  100  500  100  100   50   50
0 60 06 10 16  0   193        49
1 60 06 10 20  5   242        11
  500  500  300  400 1500  800  100  100  100  100  100
0 60 06 10 21  0   253       798
1 60 06 13 15 30   187         2
 4900  100
0 60 06 13 15 40   189        16
1 60 06 13 17  0   205        43
  100  100   50  150    0  200  100  200  400  500  500  500  500  500  400  400
  400  400  400  300  300  400  400  600 1100  800  500  300  600  500  700  700
  200  200   50   50   20   20   20   20   20  100  100
0 60 06 13 20 35   248      3432
1 60 06 25 18 35   224        59
  200  400  200  300  300  300  200  200  400  900  500  400  500  600  600  400
  400  600  600  500  500  700  500  400  400  300  300  300  200  200  150  150
  200  150  150  200  100  100   50   50  100  300  100  200  200   80   80   80
   60   70   80   90  100  200  150  150  300  150   50
0 60 06 25 23 30   283         7
1 60 06 26  0  5     2        20
  200  300  500  300  100   30   30   30   50  250  300  500  100  300 1600 1400
  400  100  150   50
0 60 06 26  1 45    22        58
1 60 06 26  6 35    80         6
  200 1200 3000  400  100  100
0 60 06 26  7  5    86      2804
1 60 07 06  0 45    10         7
  400  300  600  200  200  200  100
0 60 07 06  1 20    17      2540
1 60 07 14 21  0   253         4
 3600  600   50   50
0 60 07 14 21 20   257        23
1 60 07 14 23 15   280        36
  100    0  100  150  250  500  400  500  400  300  100  300  200  100  100  100
  100  100  100  100  100   70   70   70  100  100  100  200  150  150  100  100
  100   30   30   30
0 60 07 15  2 15    28       149
1 60 07 15 14 40   177         9
 1100  300 1700  900  500  400  300  200  100
0 60 07 15 15 25   186        28
1 60 07 15 17 45   214        26
   50  100  100  150  100  200  200  200  200  300  200  300  100  300  200  200
  200  300  300  300  300  200  100   30   30   30
0 60 07 15 19 55   240      2251
1 60 07 23 15 30   187        13
  500 1100 1600  900 1300 1800  600  600  150   50  200  100  200
0 60 07 23 16 35   200      2369
```

```
1 60 07 31 22  0   265        34
  100  100  100   30   30   30    0  300  600 1000  900  600  300  200  300  300
 2700 3500 2800  600 2000 3100 1100  600  600  400  200  200  100  100   50   50
   50   50
0 60 08 01  0 50    11       171
1 60 08 01 15  5   182        22
  100  100  100 2700  500  300  400  300  100   50   50   30   30   30   30   30
   30   30   20   20   20   20
0 60 08 01 16 55   204        17
1 60 08 01 18 20   221        42
   30   30   30   70   70   70  100  100  100  100  250  150  100  100  100  200
  200  100  200  200  600  600  500  400  400  150  150  100  100  100  150  150
  100  100  100  100   20   20   20   20   20   10
0 60 08 01 21 50   263       215
1 60 08 02 15 45   190         3
 1300  300  100
0 60 08 02 16  0   193       247
1 60 08 03 12 35   152         3
 1300  100   50
0 60 08 03 12 50   155       642
1 60 08 05 18 20   221         6
  500  500  300  400  500  200
0 60 08 05 18 50   227       271
1 60 08 06 17 25   210         7
 3200  150  150   50   50   50   50
0 60 08 06 18  0   217       265
1 60 08 07 16  5   194         3
 1500 1000  200
0 60 08 07 16 20   197       185
1 60 08 08  7 45    94        42
  100  100  150  150  200  300  600  900  600  300  100  100  100  100  100  200
  200  300  300  100  100  200   50   50  100  100  150  150  200  200  300  100
  100  100  200  200  200  100  100  100   50   50
0 60 08 08 11 15   136       297
1 60 08 09 12  0   145         3
  800 1700  100
0 60 08 09 12 15   148      1815
1 60 08 15 19 30   235         3
 1200  300  100
0 60 08 15 19 45   238       199
1 60 08 16 12 20   149         5
 5200 1200  100  200   50
0 60 08 16 12 45   154       682
1 60 08 18 21 35   260        93
 1800  600  100  200  200  200   50   50   50  150  200  200  200  200  100  200
  200   30   30   20   20   30   30   30  200  200  300  200  200   50   50  100
  100  100  100  100  100  100  100  100   50   50   50   50   50   50  100  100
  100  100   50   50   80   80   80   80   80   80   80   80  100  100  100  100
  100  100   90   90   90   90   90   90   90   90   90   90   90   90   90   90
   90   90   90   90  100  100  100  300  200  200  100   50   50
0 60 08 19  5 20    65      1373
1 60 08 23 23 45   206         3
  500 1200  600
0 60 08 24  0  0     1      3918
1 60 09 06 14 30   175         6
  900  300  300  100   50   50
0 60 09 06 15  0   181         3
1 60 09 06 15 15   184         5
  300  700  300   50   50
0 60 09 06 15 40   189      3754
1 60 09 19 16 30   199        23
  100  200   50   50   50   50  200  300  200  100  100  100  100  300  400  300
 3400 6200  300  150   50   50   50
0 60 09 19 18 25   222         2
```

```
1 60 09 19 18 35   224       21
   700  300  300  300  400  500  500  500  500  500  300  300  200  200  100  200
   200  200  100   50   50
0 60  9 19 20 20   245    66789
1 62 05 09 18  5   218        7
   200  400  500  600  500  400  200
0 62 05 09 18 40   225      220
1 62 05 10 13  0   157        3
   700  400  100
0 62 05 10 13 15   160     2055
1 62 05 17 16 30   199       96
    50   50   50   50   50   50   50   50   10   10   10   10   10   10   20   20
    30   30   30  100   50   50  200  200  300  300  200  200  200  200  200  200
   200  100  100  100  100  100  100  100  100  200  100  100  200  200  100  100
   300  300  300  200  200  200  100  100  100  100  200  200  200  200  300  100
    50   50  200  150  150  250  250  300  300  300  300  300  300  400  400  400
   500  400  500  600  400  300  300  300  300  300  200   40   40   40   40   40
0 62 05 18  0 30     7      465
1 62 05 19 15 15   184       48
   100  100  100    0  100  200  200  100  100  100  200  100  100  100  100  100
   100  100  200  200  100  150  150  100  100  100   50   50   60   60   60  100
   100  100  400  300  100   50   50   50   50   50   50   50   50  100  200  100
0 62 05 19 19 15   232     1360
1 62 05 24 12 35   152       47
   100  100  100  100  200  300  200  200  200  200  300  300  200  200  100  100
   100  100  200  200  200  300  300  100  100  200  150  150  100   30   30   30
   100  100  150  150  200  100  200  100  100  100  100  100  100    0  100
0 62 05 24 16 30   199     2032
1 62 05 31 17 50   215       41
   100  100  100  200  200  300  200  300  200  300  300  200  300  200  250  250
   300  300  300  200  400  400  300  300  250  250  200  200  100  150  150  100
   300  150  150  100  100   50   50   50   50
0 62 05 31 21 15   256       23
1 62 05 31 23 10   279       84
    50  150  200  150  150  200  200  200  100  100  200  300  500  250  250  200
   200  200  200  300  200  100  200  200  200  200  300  600  500  150  150  200
   100   30   30   30  100  100   50   50  100  100  100  100   50   50  200  200
   200  100  100  100  100  100   30   30   30   30   30   30   40   40   40   40
    40   40   40   40   40   40   40   40   20   20   20   20   20   20   20   20
    20   10   10   10
0 62 06 01  6 10    75      118
1 62 06 01 16  0   193       30
   250  250  100  200  200  200  100  100  100  100  100  200  200  200  500  300
   200  200  300  150  150  150  200  150   50   50  100   50   50   50
0 62 06 01 18 30   223     2830
1 62 06 11 14 20   173       10
  3000 2500 2500 1200  300  400  300  400  200  100
0 62 06 11 15 10   183     1239
1 62 06 15 22 25   270        5
   700  500  100    0  100
0 62 06 15 22 50   275       32
1 62 06 16  1 30    19        8
  1500  100  500  300  100  500  100   50
0 62 06 16  2 10    27      151
1 62 06 16 14 45   178        4
   500 1000  300   50
0 62 06 16 15  5   182     4938
1 62 07 03 18 35   224       18
    50  250  100  600 1200 1000  600  700  200  400  300  200  200   80   80   80
    80   50
0 62 07 03 20  5   242     1808
1 62 07 10  2 45    34        5
   300  100 2000  400   50
0 62 07 10  3 10    39     2164
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```
1 62 07 17 15 30   187        3
  700 1000  500
0 62 07 17 15 45   190       15
1 62 07 17 17  0   205        5
 1800 1700  700  400  100
0 62 07 17 17 25   210     4671
1 62 08 02 22 40   273       15
 2000 7200 4000  900  800  900  400  400  200  100  300  150   50   50   50
0 62 08 02 23 55   288      796
1 62 08 05 18 15   220        3
 1500  600  100
0 62 08 05 18 30   223       54
1 62 08 05 23  0   277        6
   50  150  200  900 1400   50
0 62 08 05 23 30   283       36
1 62 08 06  2 30    31        4
 1100  500  100  100
0 62 08 06  2 50    35       17
1 62 08 06  4 15    52        7
 3100  700  300  300  300  500  100
0 62 08 06  4 50    59     2704
1 62 08 15 14 10   171        6
  150  150 1400  400   50   50
0 62 08 15 14 40   177     1670
1 62 08 21  9 50   119       12
  300  200  500 1000  700  400  300  300  200  100  100  100
0 62 08 21 10 50   131       58
1 62 08 21 15 40   189        8
  400  700  400  600  200  200  100  100
0 62 08 21 16 20   197      713
1 62 08 24  3 45    46       21
  200  300  500  500  500  100  100  300  200  100  100  200  200  400  100  100
    0  100    0   50   50
0 62 08 24  5 30    67     3312
1 62 09 04 17 30   211        3
 6100  800   50
0 62 09 04 17 45   214      721
1 62 09 07  5 50    71       77
  150  150    0  300  800  500  300  300  100  150  100   50   50   50   50   50
  100  150  100  100  100   50  100  100  100  150  100   50   50   50   50   50
  100  200  150  150  100  150  150  250  250  200  300  300  300  200  250  250
  200  300  200 3600 1500 1000  400  300  300  300  200  100    0  100  100  100
  100   40   40   40   40   40   40   40   40   40   40   40   40
0 62 09 07 12 15   148       88
1 62 09 07 19 35   236        2
  800  600
0 62 09 07 19 45   238        5
1 62 09 07 20 10   243        2
  500  600
0 62 09 07 20 20   245     2503
1 62 09 16 12 55   156       19
  400  200  300  500  900 1200  300  300  300   50   50  200  200  300  300  300
  400  300  100
0 62 09 16 14 30   175      604
1 62 09 18 16 50   203       16
  100  300  600  300  100  200 1500  600  100    0  200  400  300  100  100  100
0 62  9 18 18 10   219    65354
1 65 05 03 16 20   197       14
 2600 1800  100  300  600  100   50  100  200  100    0    0  100  100
0 65 05 03 17 30   211      270
1 65 05 04 16  0   193        9
  200  200 1200  400  300  200    0    0  100
0 65 05 04 16 45   202      282
1 65 05 05 16 15   196        4
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  400 1000    0  100
0 65 05 05 16 35   200       13
1 65 05 05 17 40   213        3
 1400  600  100
0 65 05 05 17 55   216        4
1 65 05 05 18 15   220        5
 1600  800  400  300   50
0 65 05 05 18 40   225     1123
1 65 05 09 16 15   196        9
  400  300 3100  800  700  600  500  800  100
0 65 05 09 17  0   205      254
1 65 05 10 14 10   171        3
 1400  400   50
0 65 05 10 14 25   174      859
1 65 05 13 14  0   169        2
 2500  900
0 65 05 13 14 10   171        5
1 65 05 13 14 35   176        2
 2200  200
0 65 05 13 14 45   178      801
1 65 05 16  9 30   115        2
 2000  200
0 65 05 16  9 40   117      829
1 65 05 19  6 45    82       47
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0 65 05 19 10 40   129     2358
1 65 05 27 15 10   183        6
  300  500  500  500  100  100
0 65 05 27 15 40   189      348
1 65 05 28 20 40   249      216
  240  240  240  240  240  240  240  240   60   60   60   60   60   60   60   60
   60   60   60   60   60   60   60   60   60   60   60   60   60   60   60   60
   60   60   60   60   60   60   60   60   60   60   60   60   60   60   60   60
    0  300  200  200  100  100  200  100    0  100    0  100    0    0  100    0
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    0    0  100    0  200  100  100  100  100  200  200  300  100  100  200  200
  200  100    0  100  200  100  100  100  100  100  100  200    0  100  100  100
  200  200  100  300  300  200  100  900  700  200  100  100  200    0  300  900
  500  400  400  300  200  100  200  600  500  500  200  200  300  100  100    0
  300  100  100  100    0  100  100  100    0  100  100  100  100  100    0  100
  100    0  100    0  100    0  100  100    0  100    0  100    0  100    0  100
    0    0  100    0  100  100    0  100    0    0  100  200    0  100    0    0
   30   30   30   20   20   30   20   20
0 65 05 29 14 40   177      299
1 65 05 30 15 35   188        7
  100  100  500 1000  600  500  200
0 65 05 30 16 10   195       34
1 65 05 30 19  0   229       69
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  100  200  100  100  100  200  100  100  100  100  100  100  100  100  100  100
    0  100  300  100  200  200  100  200  100  100  100  100  200  100  100    0
  100  100  200    0  100
0 65 05 31  0 45    10     1092
1 65 06 03 19 45   238       21
  300  900 1300 2500  900 1500  200  200  400  900  200  200  300  300  400 1000
  500  200  100  100  100
0 65 06 03 21 30   259     1387
1 65 06 08 17  5   206      200
  100  100  100    0  900  600  100  300  200  500  300  400  200  200    0  100
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    0  100    0  100  100  200  200  400  500  300  200  200  100  100    0  100
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    0  100    0  100    0  100  100  100    0  100  100    0  100    0  100    0
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  100  200  100  100  100  100  100  200  100  200  100  200  200  100  200  200
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  400  200  300  300  300  200  300  400  300  300  400  400  300  400  500  400
  300  400  400  200  300  300  200  400  400  300  500  700  400  300  300  200
    0  300  200  200  100  200  100  100  100  100  100  100  100  100  100  100
    0  100  100   20   20   20   20   20
0 65 06 09  9 45    118       273
1 65 06 10  8 30    103        27
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  500  100  900 2700  800  400  600  700    0    0  100
0 65 06 10 10 45    130        30
1 65 06 10 13 15    160        17
  100  100  300  400  200  900  800  200  700 1100  500 1800  400  400  100    0
  100
0 65 06 10 14 40    177         3
1 65 06 10 14 55    180        21
  100  100  200  700  400  300  200 1800 2600 2300  900  600    0  300  900  900
 1300 2600 3900 1300  100
0 65 06 10 16 40    201        29
1 65 06 10 19  5    230         9
  200  100  200  200  100 2400 3400  700  100
0 65 06 10 19 50    239         3
1 65 06 10 20  5    242        29
   30   30   30    0  200  100  200    0  200  400  400 1000  400  700  600  500
  500  600  200  400  800  500  600  300  300  500  700  700  400
0 65 06 10 22 30    271        12
1 65 06 10 23 30    283        18
  100    0  100  200  300 1100  700  400  400  800  400  300  500  100  100  100
    0  100
0 65 06 11  1  0     13       601
1 65 06 13  3  5     38        17
  700  400  300  200  300  200  200  200  200  100  300  100  400  400  100    0
  200
0 65 06 13  4 30     55       356
1 65 06 14 10 10    123         1
 1100
0 65 06 14 10 15    124        39
1 65 06 14 13 30    163         4
 1900 4400 5200  100
0 65 06 14 13 50    167        29
1 65 06 14 16 15    196         9
 2000 1400  200 1500  900  700  400  600  100
0 65 06 14 17  0    205       381
1 65 06 16  0 45     10        24
  100  300  200  400  200  500  600  500  500  600  300  300  300  200  100  100
    0  100  100  100    0    0  100  100
0 65 06 16  2 45     34       478
1 65 06 17 18 35    224         6
 1100  500  700  400  400  100
0 65 06 17 19  5    230      1029
1 65 06 21  8 50    107         6
  300 2800 3000  900  500  200
0 65 06 21  9 20    113        89
1 65 06 21 16 45    202        11
  200  400  900  400 4000 2800 1700 1100 1200  200  100
0 65 06 21 17 40    213      1428
1 65 06 26 16 40    201         3
 2700 3700  100
0 65 06 26 16 55    204      1223
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0 65 06 30 23 45   286     2011
1 65 07 07 23 20   281       12
  300 1100  100  100  200  200  200  300  200  300  300  100
0 65 07 08  0 20     5       49
1 65 07 08  4 25    54       66
  100    0  100  100  100  100  100  100    0  100  100    0  100  100  100    0
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  200  100  200  200  200  200  300  300  400  300  300  300  300  200  200  100
  200  200  100  200  200  300  200  200  200  100  100  100  200  200  200    0
  100  100
0 65 07 08  9 55   120      107
1 65 07 08 18 50   227        7
  100  400  100 1000  100    0  200
0 65 07 08 19 25   234       73
1 65 07 09  1 30    19        8
  400 1600  700  700  100  200  600  100
0 65 07 09  2 10    27     2538
1 65 07 17 21 40   261       36
  100  300  500  600  600  700  900  600  600  200  100  500  400  400  300  200
  100  300  200  200  100  100  100  200  400  200  400  200  100  400  400  300
  200  100    0  100
0 65 07 18  0 40     9      797
1 65 07 20 19  5   230       24
  100  500 1900 2500 2000  200  200  100  100    0  100  100  200  100  300  200
  400  100  200  100  200  100    0  100
0 65 07 20 21  5   254      541
1 65 07 22 18 10   219       76
  100    0  300    0  100  500  700  500  300  600  600  400  600  700  500  300
  300  600  500  600  300  100 1000  500  400  400  200  100  100  100    0  100
  200    0  100  100  100  100  100    0   70   70   70   70   70   70   70   70
   70   70   60   60   60   60   60   60   60   60   60   60   30   30   30   30
   30   30   30   30   20   20   20   20   20   20   20   20
0 65 07 23  0 30     7       29
1 65 07 23  2 55    36        6
 2100 2200 1200  800  600  200
0 65 07 23  3 25    42      718
1 65 07 25 15 15   184        3
 2200  600  100
0 65 07 25 15 30   187      201
1 65 07 26  8 15   100        4
  800 1600  900  100
0 65 07 26  8 35   104       42
1 65 07 26 12  5   146        5
  600 1400  600  200  100
0 65 07 26 12 30   151       29
1 65 07 26 14 55   180        9
 1300  300  100  300  100    0  100    0  100
0 65 07 26 15 40   189      295
1 65 07 27 16 15   196        7
  200  300  800  700  400  200  100
0 65 07 27 16 50   203     1938
1 65 08 03 10 20   125        6
  200    0 1200  200  100  100
0 65 08 03 10 50   131     1294
1 65 08 07 22 40   273        4
 1300 2900 2400  900
0 65 08 07 23  0   277        5
1 65 08 07 23 25   282        5
 1400  600 1100  400  100
0 65 08 07 23 50   287     6817
1 65 08 31 15 55   192       15
  300  300  500  400  500  400    0    0  200  100  100  200    0    0  100
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0 65 08 31 17 10   207      2589
1 65 09 09 16 55   204         8
  200  100  100 1300  600  100  100  100
0 65 09 09 17 35   212        81
1 65 09 10  0 20     5        17
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  100
0 65 09 10  1 45    22        15
1 65 09 10  3  0    37        34
  100  100  200  100  100  100  200  200  200  100  200  100  100  200  200  100
  200  200  100  300  300  200  200  200  200  200    0  100  100  100    0  100
    0  100
0 65 09 10  5 50    71        33
1 65 09 10  8 35   104        25
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  400  400  700  300  300  200    0    0  100
0 65 09 10 10 40   129        15
1 65 09 10 11 55   144        81
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  100  200  100  200  200  200  100  100    0  100  100  200  100  100  200  100
  100  100  100  100  100  100  100  100  200  100  500  300    0  200  100  100
  100  100  200  200  100  300  200  300  100  100  100  200  100  100  200    0
  100  200  100  400  200  200  200  300  100  100    0  100    0  100    0    0
  100
0 65 09 10 18 40   225       558
1 65 09 12 17 10   207         5
  100  500  600  400  200
0 65 09 12 17 35   212      1760
1 65 09 18 20 15   244        49
  100  600  300  200  200  200  200  300  200  400  200  300  200  200  100  300
  100  200  200  200  100  300  200  100  200    0  100    0    0  100    0  100
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  100
0 65 09 19  0 20     5      2698
1 65 09 28  9 10   111        56
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*
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Network data

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XXXX
XXXX
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2
3
4
5
1C001C002            01 .40  .40260.   63,87  60,84
1C002C003C001        01 .40  .40100.   60,84  59,68
1C003C004C002        01 .40  .40290.   59,68  57,70
1C004C005C003        01 .50  .50240.   57,50  55,60
1C005B006C004        011,00 1,00145.   55,40  53,50
1B006C007C005C016    01 .30  .30185.   51,39  44,97
1C007C008R006        01 .40  .40250.   44,97  36,29
1C008C009C007        01 .50  .50225.   36,29  33,57
1C009C010C008        01 .50  .50184.   33,57  30,87
1C010C011C009        01 .50  .50172.   30,87  26,74
1C011C031C010        01 .50  .50 92.   26,74  24,98
1C013C014            011,00 1,00120.   54,76  54,40
1C014R015C013        011,00 1,00 92.   54,40  54,12
1R015C016C014        01 .20  .20130.   53,92  53,53
1S013S014            01 .40  .40120.   54,76  54,40
1S014S015S013        01 .40  .40 92.   54,40  54,12
1S015C016S014        01 .40  .40130.   54,12  53,73
1C016B006R015S015    01 .60  .60182.   53,33  52,61
1C003C024C002        01 .40  .40220.   59,68  53,00
1C024C025C003        01 .40  .40200.   52,31  44,89
1C025C026C024        01 .40  .40180.   44,89  38,00
1C026C027C025        01 .60  .60212.   37,47  30,05
1C027C032C026        01 .60  .60198.   29,59  23,53
1R028C029            01 .50  .50232.   26,55  25,75
1C029C030R028        01 .60  .60184.   25,75  25,33
1C030C031C029        01 .60  .60167.   25,33  24,91
1C031C032C011C030    01 .80  .80137.   24,02  22,65
1C032C033C031C027    01 .80  .80272.   22,65  18,67
1C033C034C032        011,00 1,00152.   18,67  16,07
1C034C035C033        011,00 1,00167.   16,07  14,30
1C035C036C034        011,00 1,00187.   14,30  12,77
1C036C037C035        011,00 1,00214.   12,77  11,66
1C037R038C036        011,20 1,20138.   11,66  11,23
1R038B038C037        01 .50  .50100.   10,43  10,27
1B038C039R038        011,20 1,20100.   21,20  21,10
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2R0281C0290,5010,00 26,55
2R0381B0380,5020,00 10,43
2B0062               51,39   800,0,655,001
2B0383                9,00   500,0,655,001       2        0,40 0,020
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1C034 0,16 0,15  10  30R028C029 0,0
 ENDE
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3AC04C00412 11,65 ,25  90
3AC05C00512 10,52 ,18  57
3AC06B00612 30,18 ,23  31
3AC13C01312 50,10 ,14
3AS13S01312 50,10      26
3AC26C02614 20,48 ,02  25
3AC28R02813 79,52 ,40  18
3AC31C03111 17,83 ,30  28
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3AC32C03212 21,90 ,29  32
3AC33C03312 14,50 ,15  18
3AC37C03713 50,52 ,07   4
 ENDE
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Quantity data

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MULDENINITIALWERTE 1  ,6010,0   ,8010,0  1,0 12,0   ,8010,0
VERSICKERUNGSRATEN   27,7 27,7 27,7 48,6 27,7 27,7 27,7 48,6
VERDUNSTUNGSRATEN               ,60  ,70  ,97 1,15 1,35 1,55 1,75 2,05 2,30 2,55
                               2,80 3,20 3,60 4,00 4,40 4,80 5,25 5,70 6,20 6,70
                               7,20 7,70 8,20 8,70 9,20 9,7510,2510,8011,3011,80
                              12,3512,9013,4013,9014,4014,9015,4516,0016,5017,00
                              18,0 18,5  19, 19,5  20, 20,5  21, 21,5  22, 22,5
TEMPERATUREN    3    3,0013,00
56          0,1  0,1  1,5  1,1  7,0 10,9 14,2 11,9  9,5  1,7  0,1  0,1
60          0,1  0,1  0,1  1,6  5,7 10,7 12,2 11,9 11,7  3,8  2,8  1,2
65          0,1  0,1  0,1  1,5  7,1 11,1 14,0 12,7  7,8  5,9  2,9  0,1
56          2,4  4,0  7,4  8,6 14,3 19,3 22,7 19,7 15,6  9,7  5,2  3,0
60          3,4  4,0 14,1 12,7 15,9 19,2 18,4 19,2 16,5  9,1  6,4  6,0
65          2,0  1,9  2,4  8,3 15,1 18,1 22,1 22,4 15,1  9,5  7,1  1,0
EINHEITSGANGLINIEN   5. ,200   ,064   ,180   ,064   ,200   ,064   ,055   ,064
                    10. ,410   ,110   ,370   ,110   ,410   ,110   ,150   ,110
                    15. ,222   ,120   ,230   ,120   ,222   ,120   ,240   ,120
                    20. ,190   ,118   ,100   ,118   ,190   ,118   ,200   ,118
                    25. ,050   ,109   ,060   ,109   ,050   ,109   ,130   ,109
                    30. ,030   ,097   ,035   ,097   ,030   ,097   ,090   ,097
                    35. ,010   ,082   ,020   ,082   ,010   ,082   ,060   ,082
                    40. ,005   ,067   ,010   ,067   ,005   ,067   ,040   ,067
                    45.        ,053   ,005   ,053          ,053   ,030   ,053
                    50.        ,043   ,002   ,043          ,043   ,020   ,043
                    55.        ,033          ,033          ,033   ,010   ,033
                    60.        ,026          ,026          ,026   ,005   ,026
                    65.        ,020          ,020          ,020   ,003   ,020
                    70.        ,016          ,016          ,016   ,001   ,016
                    75.        ,011          ,011          ,011          ,011
                    80.        ,009          ,009          ,009          ,009
                    85.        ,007          ,007          ,007          ,007
                    90.        ,005          ,005          ,005          ,005
                    95.        ,004          ,004          ,004          ,004
                   100.        ,003          ,003          ,003          ,003
                   105.        ,002          ,002          ,002          ,002
EINHEITSGANGLINIEN 110.        ,001          ,001          ,001          ,001
TW-ABFLUESSE         0.00 4.05 4.00 4.05 8.00 4.0512.00 4.0516.00 4.0520.00 4.05
TW-ABFLUESSE         0.30 4.05 4.30 4.05 8.30 4.0512.30 4.0516.30 4.0520.30 4.05
TW-ABFLUESSE         1.00 4.05 5.00 4.05 9.00 4.0513.00 4.0517.00 4.0521.00 4.05
TW-ABFLUESSE         1.30 4.05 5.30 4.05 9.30 4.0513.30 4.0517.30 4.0521.30 4.05
TW-ABFLUESSE         2.00 4.05 6.00 4.0510.00 4.0514.00 4.0518.00 4.0522.00 4.05
TW-ABFLUESSE         2.30 4.05 6.30 4.0510.30 4.0514.30 4.0518.30 4.0522.30 4.05
TW-ABFLUESSE         3.00 4.05 7.00 4.0511.00 4.0515.00 4.0519.00 4.0523.00 4.05
TW-ABFLUESSE         3.30 4.05 7.30 4.0511.30 4.0515.30 4.0519.30 4.0523.30 4.05
IW-ABFLUESSE        1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
                    1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
                    1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
                    1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
C037 1,30
XXXX
XXXX
XXXX
            -1
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Quality data

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QQS-EPA-EXAMPLE
1  B.O.D.          2  T.S.S.            312FECAL COLIFORM    4  COD
 10.0 15.0 20.0 15.0 75.0 80.0110.0 80.0100.0100.0100.0100.0 50.0 60.0 70.0 60.0
 10.0 15.0 20.0 15.0 75.0 80.0110.0 80.0100.0100.0100.0100.0 50.0 60.0 70.0 60.0
AUFBAUZEITEN      240 240 240 240 720 720 720 720  24  24  24  24 240 240 240 240
-34,2-34,2-34,2-34,2-34,7-34,7-34,6-34,713,3413,3413,3413,34-34,2-34,2-34,2-34,2
 1,89 1,89 1,89 1,89  .21  .21  ,44  .211133.1133.1133.1133. 1,89 1,89 1,89 1,89
465,2465,2465,2465,286,3486,34113,686,343825,3825,3825,3825,465,2465,2465,2465,2
STRASSENREINIGUNG   168    84      5 35 35  5 10 40 40 10  8 30 30  8  5 35 35  5
EINHEITSGANGLINIEN SCHMUTZSTOFF 1    5.0   4.10        3.08        3.08        4.10
                                1   10.0   4.28        3.21        3.21        4.28
                                1   15.0   2.00        1.50        1.50        2.00
                                1   20.0   1.03        0.77        0.77        1.03
                                1   25.0   0.65        0.49        0.49        0.65
                                1   30.0   0.37        0.28        0.28        0.37
                                1   35.0   0.19        0.14        0.14        0.19
                                1   40.0   0.04        0.03        0.03        0.04
                                1   45.0   0.00        0.00        0.00        0.00
                                1   50.0   0.00        0.00        0.00        0.00
                                1   55.0   0.00        0.00        0.00        0.00
EINHEITSGANGLINIEN SCHMUTZSTOFF 1   60.0   0.00        0.00        0.00        0.00
EINHEITSGANGLINIEN SCHMUTZSTOFF 2    5.0   5.10        3.83        7.65        5.10
                                2   10.0   7.15        5.36       10.73        7.15
                                2   15.0   3.51        2.63        5.27        3.51
                                2   20.0   2.05        1.54        3.08        2.05
                                2   25.0   1.35        1.01        2.03        1.35
                                2   30.0   0.90        0.68        1.35        0.90
                                2   35.0   0.60        0.45        0.90        0.60
                                2   40.0   0.35        0.26        0.53        0.35
                                2   45.0   0.20        0.15        0.30        0.20
                                2   50.0   0.09        0.07        0.14        0.09
                                2   55.0   0.02        0.02        0.03        0.02
EINHEITSGANGLINIEN SCHMUTZSTOFF 2   60.0   0.00        0.00        0.00        0.00
EINHEITSGANGLINIEN SCHMUTZSTOFF 3    5.0  15.00       15.00        7.50       15.00
                                3   10.0  39.50       39.50       19.75       39.50
                                3   15.0  30.00       30.00       15.00       30.00
                                3   20.0  19.00       19.00        9.50       19.00
                                3   25.0  10.00       10.00        5.00       10.00
                                3   30.0   5.50        5.50        2.75        5.50
                                3   35.0   3.50        3.50        1.75        3.50
                                3   40.0   2.00        2.00        1.00        2.00
                                3   45.0   1.50        1.50        0.75        1.50
                                3   50.0   1.00        1.00        0.50        1.00
                                3   55.0   0.50        0.50        0.25        0.50
EINHEITSGANGLINIEN SCHMUTZSTOFF 3   60.0   0.00        0.00        0.00        0.00
EINHEITSGANGLINIEN SCHMUTZSTOFF 4    5.0  15.40       15.4        15.4        15.40
                                4   10.0  16.05       16.05       16.05       16.05
                                4   15.0   7.50        7.50        7.50        7.50
                                4   20.0   3.85        3.85        3.85        3.85
                                4   25.0   2.45        2.45        2.45        2.45
                                4   30.0   1.40        1.40        1.40        1.40
                                4   35.0   0.70        0.70        0.70        0.70
                                4   40.0   0.15        0.15        0.15        0.15
                                4   45.0   0.00        0.00        0.00        0.00
                                4   50.0   0.00        0.00        0.00        0.00
                                4   55.0   0.00        0.00        0.00        0.00
EINHEITSGANGLINIEN SCHMUTZSTOFF 4   60.0   0.00        0.00        0.00        0.00
GEBIETSFAKTOREN 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
REGENDAUER    5.01.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.00
             10.01.001.001.001.001.001.001.001.00 .94 .91 .91 .941.001.001.001.00
             15.0 .98 .96 .96 .98 .99 .99 .991.00 .88 .83 .83 .88 .98 .96 .96 .98
             20.0 .90 .87 .87 .90 .98 .98 .98 .99 .80 .75 .75 .80 .90 .87 .87 .90
             25.0 .76 .70 .73 .77 .97 .95 .96 .98 .73 .66 .67 .73 .76 .70 .73 .77
             30.0 .64 .55 .58 .67 .93 .88 .90 .95 .67 .58 .60 .67 .64 .55 .58 .67
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                      35.0 .55 .45 .49 .59 .87 .79 .83 .90 .60 .51 .53 .60 .55 .45 .49 .59
                      40.0 .48 .38 .42 .55 .78 .66 .72 .84 .54 .43 .46 .54 .48 .38 .42 .55
                      45.0 .43 .33 .37 .51 .69 .55 .61 .76 .48 .37 .41 .48 .43 .33 .37 .51
                      50.0 .38 .29 .33 .48 .59 .45 .52 .66 .44 .31 .36 .44 .38 .29 .33 .48
                      55.0 .35 .27 .31 .46 .53 .39 .46 .59 .39 .28 .32 .39 .35 .27 .31 .46
                      60.0 .33 .25 .29 .44 .48 .35 .42 .54 .36 .23 .28 .36 .33 .25 .29 .44
                      65.0 .32 .23 .28 .43 .44 .32 .39 .49 .33 .22 .26 .33 .32 .23 .28 .43
                      70.0 .31 .22 .27 .42 .42 .31 .37 .47 .32 .21 .25 .32 .31 .22 .27 .42
                      75.0 .30 .21 .26 .41 .41 .31 .36 .46 .31 .20 .24 .31 .30 .21 .26 .41
                      80.0 .30 .20 .25 .40 .40 .30 .35 .40 .30 .20 .23 .30 .30 .20 .25 .40
                      85.0 .30 .20 .25 .40 .40 .30 .35 .40 .30 .20 .23 .30 .30 .20 .25 .40
                      90.0 .30 .20 .25 .40 .40 .30 .35 .40 .30 .20 .23 .30 .30 .20 .25 .40
                      95.0 .30 .20 .25 .40 .40 .30 .35 .40 .30 .20 .23 .30 .30 .20 .25 .40
                     100.0 .30 .20 .25 .40 .40 .30 .35 .40 .30 .20 .23 .30 .30 .20 .25 .40
TAGESZEITEINFLUSS           0.00 0.80 0.80 1.00 0.80      12.00 1.00 1.00 0.60 1.00
                            0.30 0.80 0.80 1.00 0.80      12.30 1.00 1.00 0.57 1.00
                            1.00 0.80 0.80 1.00 0.80      13.00 1.00 1.00 0.55 1.00
                            1.30 0.80 0.80 1.00 0.80      13.30 1.00 1.00 0.55 1.00
                            2.00 0.80 0.80 1.00 0.80      14.00 0.99 0.99 0.55 0.99
                            2.30 0.80 0.80 1.00 0.80      14.30 0.98 0.98 0.60 0.98
                            3.00 0.80 0.80 1.00 0.80      15.00 0.97 0.97 0.65 0.97
                            3.30 0.80 0.80 1.00 0.80      15.30 0.98 0.98 0.70 0.98
                            4.00 0.82 0.82 1.00 0.82      16.00 0.99 0.99 0.80 0.99
                            4.30 0.84 0.84 1.00 0.84      16.30 1.00 1.00 0.90 1.00
                            5.00 0.86 0.86 1.00 0.86      17.00 1.00 1.00 1.00 1.00
                            5.30 0.89 0.89 1.00 0.89      17.30 1.00 1.00 1.00 1.00
                            6.00 0.92 0.92 1.00 0.92      18.00 1.00 1.00 1.00 1.00
                            6.30 0.95 0.95 1.00 0.95      18.30 1.00 1.00 1.00 1.00
                            7.00 1.00 1.00 1.00 1.00      19.00 0.98 0.98 1.00 0.98
                            7.30 1.00 1.00 1.00 1.00      19.30 0.96 0.96 1.00 0.96
                            8.00 1.00 1.00 0.95 1.00      20.00 0.94 0.94 1.00 0.94
                            8.30 1.00 1.00 0.90 1.00      20.30 0.92 0.92 1.00 0.92
                            9.00 0.99 0.99 0.85 0.99      21.00 0.90 0.90 1.00 0.90
                            9.30 0.98 0.98 0.80 0.98      21.30 0.88 0.88 1.00 0.88
                           10.00 0.97 0.97 0.75 0.97      22.00 0.86 0.86 1.00 0.86
                           10.30 0.98 0.98 0.70 0.98      22.30 0.84 0.84 1.00 0.84
                           11.00 0.99 0.99 0.65 0.99      23.00 0.82 0.82 1.00 0.82
                           11.30 1.00 1.00 0.60 1.00      23.30 0.80 0.80 1.00 0.80
JAHRESZEITEINFLUSS 1  .80  .75  .80  .90  .87  .80  .75  .75  .82  .93 1.00  .98
JAHRESZEITEINFLUSS 2  .99 1.00  .94  .84  .80  .80  .80  .80  .80  .80  .84  .92
JAHRESZEITEINFLUSS 3  .40  .42  .46  .60  .82  .94  .99 1.00  .96  .77  .55  .43
JAHRESZEITEINFLUSS 4  .80  .75  .80  .90  .87  .80  .75  .75  .82  .93 1.00  .98
BECKENKLAERWIRKUNG               5 86 68 99 86       105 69 32 93 69       205 65 30 90 65
                                10 81 45 99 81       110 68 31 93 68       210 65 30 90 65
                                15 78 42 98 78       115 68 31 93 68       215 65 30 90 65
                                20 76 40 98 76       120 68 31 92 68       220 65 30 90 65
                                25 75 39 97 75       125 68 31 92 68       225 65 30 89 65
                                30 74 38 97 74       130 67 31 92 67       230 65 30 89 65
                                35 73 37 97 73       135 67 31 92 67       235 65 30 89 65
                                40 73 36 96 73       140 67 31 92 67       240 65 30 89 65
                                45 72 36 96 72       145 67 31 92 67       245 65 30 89 65
                                50 72 35 96 72       150 67 31 91 67       250 65 30 89 65
                                55 72 35 95 72       155 66 31 91 66       255 65 30 89 65
                                60 71 34 95 71       160 66 31 91 66       260 65 30 89 65
                                65 71 34 95 71       165 66 31 91 66       265 65 30 89 65
                                70 71 33 95 71       170 66 31 91 66       270 65 30 88 65
                                75 70 33 94 70       175 66 31 91 66       275 65 30 88 65
                                80 70 33 94 70       180 65 30 91 65       280 65 30 88 65
                                85 70 33 94 70       185 65 30 90 65       285 65 30 88 65
                                90 69 32 94 69       190 65 30 90 65       290 65 30 88 65
                                95 69 32 94 69       195 65 30 90 65       295 65 30 88 65
                               100 69 32 93 69       200 65 30 90 65       300 65 30 88 65
BECKENKLAERWIRKUNG             0.5 86 68 98 86       8.5 58 30 83 58      16.5 58 30 73 58
                               1.0 78 48 97 78       9.0 58 30 82 58      17.0 58 30 73 58
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                        1,5 74 42 95 74       9,5 58 30 81 58      17,5 58 30 72 58
                        2,0 68 38 95 68      10,0 58 30 80 58      18,0 58 30 72 58
                        2,5 66 35 93 66      10,5 58 30 79 58      18,5 58 30 71 58
                        3,0 64 33 92 64      11,0 58 30 79 58      19,0 58 30 71 58
                        3,5 62 32 91 62      11,5 58 30 78 58      19,5 58 30 70 58
                        4,0 61 31 90 61      12,0 58 30 78 58      20,0 58 30 70 58
                        4,5 60 31 89 60      12,5 58 30 77 58      20,5 58 30 70 58
                        5,0 59 30 88 59      13,0 58 30 77 58      21,0 58 30 70 58
                        5,5 58 30 87 58      13,5 58 30 76 58      21,5 58 30 70 58
                        6,0 58 30 86 58      14,0 58 30 75 58      22,0 58 30 70 58
                        6,5 58 30 85 58      14,5 58 30 75 58      22,5 58 30 70 58
                        7,0 58 30 84 58      15,0 58 30 75 58      23,0 58 30 70 58
                        7,5 58 30 84 58      15,5 58 30 74 58      23,5 58 30 70 58
                        8,0 58 30 83 58      16,0 58 30 74 58      24,0 58 30 70 58
TW-SCHMUTZMENGEN  1   0,00250,0250,0250,0250,0         12,00250,0250,0250,0250,0
                      0,30250,0250,0250,0250,0         12,30250,0250,0250,0250,0
                      1,00250,0250,0250,0250,0         13,00250,0250,0250,0250,0
                      1,30250,0250,0250,0250,0         13,30250,0250,0250,0250,0
                      2,00250,0250,0250,0250,0         14,00250,0250,0250,0250,0
                      2,30250,0250,0250,0250,0         14,30250,0250,0250,0250,0
                      3,00250,0250,0250,0250,0         15,00250,0250,0250,0250,0
                      3,30250,0250,0250,0250,0         15,30250,0250,0250,0250,0
                      4,00250,0250,0250,0250,0         16,00250,0250,0250,0250,0
                      4,30250,0250,0250,0250,0         16,30250,0250,0250,0250,0
                      5,00250,0250,0250,0250,0         17,00250,0250,0250,0250,0
                      5,30250,0250,0250,0250,0         17,30250,0250,0250,0250,0
                      6,00250,0250,0250,0250,0         18,00250,0250,0250,0250,0
                      6,30250,0250,0250,0250,0         18,30250,0250,0250,0250,0
                      7,00250,0250,0250,0250,0         19,00250,0250,0250,0250,0
                      7,30250,0250,0250,0250,0         19,30250,0250,0250,0250,0
                      8,00250,0250,0250,0250,0         20,00250,0250,0250,0250,0
                      8,30250,0250,0250,0250,0         20,30250,0250,0250,0250,0
                      9,00250,0250,0250,0250,0         21,00250,0250,0250,0250,0
                      9,30250,0250,0250,0250,0         21,30250,0250,0250,0250,0
                     10,00250,0250,0250,0250,0         22,00250,0250,0250,0250,0
                     10,30250,0250,0250,0250,0         22,30250,0250,0250,0250,0
                     11,00250,0250,0250,0250,0         23,00250,0250,0250,0250,0
                     11,30250,0250,0250,0250,0         23,30250,0250,0250,0250,0
TW-SCHMUTZMENGEN  2   0,00280,0280,0280,0280,0         12,00280,0280,0280,0280,0
                      0,30280,0280,0280,0280,0         12,30280,0280,0280,0280,0
                      1,00280,0280,0280,0280,0         13,00280,0280,0280,0280,0
                      1,30280,0280,0280,0280,0         13,30280,0280,0280,0280,0
                      2,00280,0280,0280,0280,0         14,00280,0280,0280,0280,0
                      2,30280,0280,0280,0280,0         14,30280,0280,0280,0280,0
                      3,00280,0280,0280,0280,0         15,00280,0280,0280,0280,0
                      3,30280,0280,0280,0280,0         15,30280,0280,0280,0280,0
                      4,00280,0280,0280,0280,0         16,00280,0280,0280,0280,0
                      4,30280,0280,0280,0280,0         16,30280,0280,0280,0280,0
                      5,00280,0280,0280,0280,0         17,00280,0280,0280,0280,0
                      5,30280,0280,0280,0280,0         17,30280,0280,0280,0280,0
                      6,00280,0280,0280,0280,0         18,00280,0280,0280,0280,0
                      6,30280,0280,0280,0280,0         18,30280,0280,0280,0280,0
                      7,00280,0280,0280,0280,0         19,00280,0280,0280,0280,0
                      7,30280,0280,0280,0280,0         19,30280,0280,0280,0280,0
                      8,00280,0280,0280,0280,0         20,00280,0280,0280,0280,0
                      8,30280,0280,0280,0280,0         20,30280,0280,0280,0280,0
                      9,00280,0280,0280,0280,0         21,00280,0280,0280,0280,0
                      9,30280,0280,0280,0280,0         21,30280,0280,0280,0280,0
                     10,00280,0280,0280,0280,0         22,00280,0280,0280,0280,0
                     10,30280,0280,0280,0280,0         22,30280,0280,0280,0280,0
                     11,00280,0280,0280,0280,0         23,00280,0280,0280,0280,0
                     11,30280,0280,0280,0280,0         23,30280,0280,0280,0280,0
TW-SCHMUTZMENGEN  3   0,00 20,0 20,0 20,0 20,0         12,00 20,0 20,0 20,0 20,0
                      0,30 20,0 20,0 20,0 20,0         12,30 20,0 20,0 20,0 20,0
                      1.00 20.0 20.0 20.0 20.0      13.00 20.0 20.0 20.0 20.0
                      1.30 20.0 20.0 20.0 20.0      13.30 20.0 20.0 20.0 20.0
                      2.00 20.0 20.0 20.0 20.0      14.00 20.0 20.0 20.0 20.0
                      2.30 20.0 20.0 20.0 20.0      14.30 20.0 20.0 20.0 20.0
                      3.00 20.0 20.0 20.0 20.0      15.00 20.0 20.0 20.0 20.0
                      3.30 20.0 20.0 20.0 20.0      15.30 20.0 20.0 20.0 20.0
                      4.00 20.0 20.0 20.0 20.0      16.00 20.0 20.0 20.0 20.0
                      4.30 20.0 20.0 20.0 20.0      16.30 20.0 20.0 20.0 20.0
                      5.00 20.0 20.0 20.0 20.0      17.00 20.0 20.0 20.0 20.0
                      5.30 20.0 20.0 20.0 20.0      17.30 20.0 20.0 20.0 20.0
                      6.00 20.0 20.0 20.0 20.0      18.00 20.0 20.0 20.0 20.0
                      6.30 20.0 20.0 20.0 20.0      18.30 20.0 20.0 20.0 20.0
                      7.00 20.0 20.0 20.0 20.0      19.00 20.0 20.0 20.0 20.0
                      7.30 20.0 20.0 20.0 20.0      19.30 20.0 20.0 20.0 20.0
                      8.00 20.0 20.0 20.0 20.0      20.00 20.0 20.0 20.0 20.0
                      8.30 20.0 20.0 20.0 20.0      20.30 20.0 20.0 20.0 20.0
                      9.00 20.0 20.0 20.0 20.0      21.00 20.0 20.0 20.0 20.0
                      9.30 20.0 20.0 20.0 20.0      21.30 20.0 20.0 20.0 20.0
                     10.00 20.0 20.0 20.0 20.0      22.00 20.0 20.0 20.0 20.0
                     10.30 20.0 20.0 20.0 20.0      22.30 20.0 20.0 20.0 20.0
                     11.00 20.0 20.0 20.0 20.0      23.00 20.0 20.0 20.0 20.0
                     11.30 20.0 20.0 20.0 20.0      23.30 20.0 20.0 20.0 20.0
TW-SCHMUTZMENGEN  4   0.00 360. 360. 360. 360.      12.00 360. 360. 360. 360.
                      0.30 360. 360. 360. 360.      12.30 360. 360. 360. 360.
                      1.00 360. 360. 360. 360.      13.00 360. 360. 360. 360.
                      1.30 360. 360. 360. 360.      13.30 360. 360. 360. 360.
                      2.00 360. 360. 360. 360.      14.00 360. 360. 360. 360.
                      2.30 360. 360. 360. 360.      14.30 360. 360. 360. 360.
                      3.00 360. 360. 360. 360.      15.00 360. 360. 360. 360.
                      3.30 360. 360. 360. 360.      15.30 360. 360. 360. 360.
                      4.00 360. 360. 360. 360.      16.00 360. 360. 360. 360.
                      4.30 360. 360. 360. 360.      16.30 360. 360. 360. 360.
                      5.00 360. 360. 360. 360.      17.00 360. 360. 360. 360.
                      5.30 360. 360. 360. 360.      17.30 360. 360. 360. 360.
                      6.00 360. 360. 360. 360.      18.00 360. 360. 360. 360.
                      6.30 360. 360. 360. 360.      18.30 360. 360. 360. 360.
                      7.00 360. 360. 360. 360.      19.00 360. 360. 360. 360.
                      7.30 360. 360. 360. 360.      19.30 360. 360. 360. 360.
                      8.00 360. 360. 360. 360.      20.00 360. 360. 360. 360.
                      8.30 360. 360. 360. 360.      20.30 360. 360. 360. 360.
                      9.00 360. 360. 360. 360.      21.00 360. 360. 360. 360.
                      9.30 360. 360. 360. 360.      21.30 360. 360. 360. 360.
                     10.00 360. 360. 360. 360.      22.00 360. 360. 360. 360.
                     10.30 360. 360. 360. 360.      22.30 360. 360. 360. 360.
                     11.00 360. 360. 360. 360.      23.00 360. 360. 360. 360.
                     11.30 360. 360. 360. 360.      23.30 360. 360. 360. 360.
IW-KONZENTRATION       270. 250.  20. 360.
XXXX
XXXX
XXXX
    -1.0
```

APPENDIX 8

TEST EXAMPLE FOR DWTFLC

cont on next pg

NOTE: This example is similar to the example contained on the computer tape.

Output

```
WASG,AX  •W05.

WASG,AX  •IF01.

WASG,AX  •IF02.

WASG,AX  •IF03.

WASG,AX  •IF04.

WASG,AX  •IF05.

WASG,AX  •IF06.

WASG,AX  •IF07.

WASG,AX  •IF08.

WASG,AX  •IF09.

WASG,AX  •IF10.

WASG,AX  •IF11.

WASG,AX  •IF12.

WASG,AX  •IF13.

WASG,AX  •IF14.

WASG,AX  •IF15.

WASG,AX  •IF16.

WASG,AX  •IF17.

WASG,AX  •IF18.

WASG,AX  •IF19.

WASG,AX  •IF20.
```

```
@ASG,AX  *IF21.

@ASG,AX  *IF22.

@ASG,AX  *IF23.

@ASG,AX  *IF24.

@ASG,AX  *IF25.

@ASG,AX  *IF26.

@USE  11,*IF01.

@USE  12,*IF02.

@USE  13,*IF03.

@USE  15,*IF05.

@USE  16,*IF06.

@USE  17,*IF07.

@USE  18,*IF08.

@USE  19,*IF09.

@USE  20,*IF10.

@USE  21,*IF11.

@USE  22,*IF12.

@USE  23,*IF13.

@USE  24,*IF14.

@USE  25,*IF15.

@USE  26,*IF16.

@USE  27,*IF17.

@XQT  *QQS.DWTFLC
```

```
INTAG      1      ITERTN     12

ROHR   KNA   KNE        HA          HE          QA          QE         CVZSR

   1   C001  C002    .0143865    .0144534    .0086427    .0086427    .0000000
   2   C002  C003    .0144534    .0144534    .0086427    .0086427    .0000000
   3   C003  C004    .0060543    .0060546    .0027731    .0027731    .0000000
   4   C004  C005    .0098666    .0098660    .0070175    .0070175    .0000000
   5   C005  B006    .0033325    .0033329    .0094475    .0094475    .0000000
   6   B006  C007    .0286452    .0286453    .0185155    .0185155    .0000000
   7   C007  C008    .0146891    .0210420    .0185155    .0185155    .0000000
   8   C008  C009    .0210431    .0210428    .0185155    .0185155    .0000000
   9   C009  C010    .0190910    .0190915    .0185155    .0185155    .0000000
  10   C010  C011    .0131271    .0167113    .0185155    .0185155    .0000000
  11   C011  C031    .0167119    .0167119    .0185155    .0185155    .0000000
  12   C013  C014    .0000000    .0000000    .0000000    .0000000    .0000000
  13   C014  R015    .0000000    .0000000    .0000000    .0000000    .0000000
  14   R015  C016    .0000000    .0000000    .0000000    .0000000    .0000000
  15   S013  S014    .0174420    .0174420    .0052771    .0052771    .0000000
  16   S014  S015    .0172046    .0174417    .0052771    .0052771    .0000000
  17   S015  C016    .0174420    .0174420    .0052771    .0052771    .0000000
  18   C016  B006    .0078066    .0078065    .0052771    .0052771    .0000000
  19   C003  C024    .0060529    .0060546    .0058696    .0058696    .0000000
  20   C024  C025    .0054818    .0054757    .0058696    .0058696    .0000000
  21   C025  C026    .0053878    .0053905    .0058696    .0058696    .0000000
  22   C026  C027    .0039345    .0039319    .0079432    .0079432    .0000000
  23   C027  C032    .0042006    .0042054    .0079432    .0079432    .0000000
  24   R028  C029    .0123812    .0123812    .0057955    .0057955    .0000000
  25   C029  C030    .0113116    .0113115    .0057955    .0057955    .0000000
  26   C030  C031    .0107717    .0107717    .0057955    .0057955    .0000000
  27   C031  C032    .0128357    .0178026    .0263320    .0263320    .0000000
  28   C032  C033    .0178032    .0178036    .0371142    .0371142    .0000000
  29   C033  C034    .0086311    .0149722    .0381712    .0381712    .0000000
  30   C034  C035    .0149764    .0149779    .0381712    .0381712    .0000000
  31   C035  C036    .0127743    .0214380    .0381712    .0381712    .0000000
  32   C036  C037    .0214392    .0214392    .0381712    .0381712    .0000000
  33   C037  R038    .0210413    .0210413    .0389893    .0389893    .0000000
  34   R038  B038    .1227522    .1227522    .0389893    .0389893    .0000000
  35   B038  C039    .0372869    .0372869    .0389893    .0389893    .0000000

RUE      KNNMRU      QURUEI

  1       R015      .000000000
  2       R028      .000000000
  3       R038      .000000000

RNBK    KNNMRB        HB            QAB          QEB1          QEB2          VOLB

  1      B006       .047630       .018515       .018515       .000000     38.103690
  2      B038       .000000       .038969       .038989       .000000       .000000

STE    KNNMSE   ISTA     QVPA       FACT

  1     R028      0     1.00000    1.00000
```

```
*** TWARHN ***       1    12
*** TWARHN ***       1    12

*** TWARHN ***  MAX NUMBER OF ITERATIONS   12 AVERAGE  12.000

@BRKPT  PRINT$
```

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APPENDIX 9

TEST EXAMPLE FOR RCVRIN AND MNTWKC

NOTE: This example is similar to the example contained on the computer tape.

BOTTOM OF IMAGE AREA OUTSIDE DIMENSION FOR TABLES AND ILLUSTRATIONS

EPA-287 (Cin.)
(4-76)

PAGE NUMBER

Exerpt of Output

```
@ASG,AX  *0Q5.

@ASG,AX  *IF01.

@ASG,AX  *IF02.

@ASG,AX  *IF03.

@ASG,AX  *IF04.

@ASG,AX  *IF05.

@ASG,AX  *IF06.

@ASG,AX  *IF07.

@ASG,AX  *IF08.

@ASG,AX  *IF09.

@ASG,AX  *IF10.

@ASG,AX  *IF11.

@ASG,AX  *IF12.

@ASG,AX  *IF13.

@ASG,AX  *IF14.

@ASG,AX  *IF15.

@ASG,AX  *IF16.

@ASG,AX  *IF17.

@ASG,AX  *IF18.

@ASG,AX  *IF19.

@ASG,AX  *IF20.
```

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```
@ASG,AX  *IF21.
@ASG,AX  *IF22.
@ASG,AX  *IF23.
@ASG,AX  *IF24.
@ASG,AX  *IF25.
@ASG,AX  *IF26.
@USE  11,*IF01.
@USE  12,*IF02.
@USE  13,*IF03.
@USE  15,*IF05.
@USE  16,*IF06.
@USE  17,*IF07.
@USE  18,*IF08.
@USE  19,*IF09.
@USE  20,*IF10.
@USE  21,*IF11.
@USE  22,*IF12.
@USE  23,*IF13.
@USE  24,*IF14.
@USE  25,*IF15.
@USE  26,*IF16.
```

```
WUSE  27,*IF17.

WXQT  *QQS.RCVRIN

WXQT  *QQS.MNTWKC
 *** HNCNIN *** MAXIMUM FLOWTIME CORECTED TO  24 TIMESTEPS

 *** RDRNST ***  DURATION OF NEXT RAINFALL   15  START DATE  1  1  1 215

 --- RSET ---   IEESIN      1 IZRE    214 LOBBB      0 JRP1      0

 *** RECOVS ***  DATA SAVE AT DATE  1  1  1   1  L1  3

 *** DATMNL ***  OLD DATE  1  1  1   1
                 NEW DATE  1  1  1 215  JTBP1  3

 --- DATENA ---   IRN    214
                  IDTENT    1    1   1 215

 --- RBUPDT ---   JRP1   1 JRP2   1 JRB1   1 JRB2   1
                  JREZ     1    064000    0    0    0    0    0    0    0
                         0    0    0    0    0    0    0    0    0    0
                  IENDS    1    0    0    0    0    0    0    0    0    0
                           0    0    0    0    0    0    0    0    0    0

 --- EFNGER ---  IRAINS   1
EFFNGB(1,1)     0.  EFFNGB(2,1)     0.  EFFNGB(3,1)     0.  EFFNGB(4,1)     0.
EFFNGU(1,1)     0.  EFFNGU(2,1)     0.  EFFNGU(3,1)     0.  EFFNGU(4,1)     0.

 --- HDYRHN ---  DRY WEATHER FLOW INITILALISATION FINISHED
```

```
INTAG   215      ITERTN     0

ROHR   KNA   KNE         HA          HE          QA          QE          CVZSR

  1   C001  C002      .0143865    .0144534    .0086427    .0086427    .0039261
  2   C002  C003      .0144534    .0144534    .0086427    .0086427    .0015136
  3   C003  C004      .0060543    .0060546    .0027731    .0027731    .0018387
  4   C004  C005      .0098666    .0098660    .0070175    .0070175    .0030996
  5   C005  B006      .0033325    .0033329    .0094475    .0094475    .0012651
  6   B006  C007      .0286452    .0286453    .0185155    .0185155    .0041621
  7   C007  C008      .0146891    .0210420    .0185155    .0185155    .0046772
  8   C008  C009      .0210431    .0210428    .0185155    .0185155    .0061977
  9   C009  C010      .0190918    .0190915    .0185155    .0185155    .0045983
 10   C010  C011      .0131271    .0167113    .0185155    .0185155    .0033590
 11   C011  C031      .0167119    .0167119    .0185155    .0185155    .0020126
 12   C013  C014      .0000000    .0000000    .0000000    .0000000    .0000000
 13   C014  RO15      .0000000    .0000000    .0000000    .0000000    .0000000
 14   RO15  C016      .0000000    .0000000    .0000000    .0000000    .0000000
 15   S013  S014      .0174420    .0174420    .0052771    .0052771    .0021918
 16   S014  S015      .0172046    .0174417    .0052771    .0052771    .0016690
 17   S015  C016      .0174420    .0174420    .0052771    .0052771    .0023745
 18   C016  B006      .0078066    .0078065    .0052771    .0052771    .0022318
 19   C003  C024      .0060527    .0060546    .0058696    .0058696    .0013947
 20   C024  C025      .0054818    .0054757    .0058696    .0058696    .0011475
 21   C025  C026      .0053878    .0053905    .0058696    .0058696    .0010158
 22   C026  C027      .0039345    .0039319    .0079432    .0079432    .0013098
 23   C027  C032      .0042006    .0042054    .0079432    .0079432    .0013072
 24   RO28  C029      .0123812    .0123812    .0057955    .0057955    .0037600
 25   C029  C030      .0113116    .0113115    .0057955    .0057955    .0032693
 26   C030  C031      .0107717    .0107717    .0057955    .0057955    .0028257
 27   C031  C032      .0128357    .0178026    .0263320    .0263320    .0043956
 28   C032  C033      .0178032    .0178036    .0371142    .0371142    .0101422
 29   C033  C034      .0086311    .0149722    .0381712    .0381712    .0046963
 30   C034  C035      .0149769    .0149779    .0381712    .0381712    .0065481
 31   C035  C036      .0127743    .0214380    .0381712    .0381712    .0083746
 32   C036  C037      .0214392    .0214392    .0381712    .0381712    .0120113
 33   C037  RO38      .0210413    .0210413    .0389893    .0389893    .0091222
 34   RO38  BO38      .1227522    .1227522    .0389893    .0389893    .0160682
 35   BO38  C039      .0372869    .0372869    .0389893    .0389893    .0117140


 RUE       KNNMRU      QURUEF

  1         RO15      .000000000
  2         RO28      .000000000
  3         RO38      .000000000


 RHBK     KNNRHB        HB            QAB           QEB1          QEB2          VOLB

  1        B006       .047630       .018515       .018515       .000000      38.103640
  2        BO38       .000000       .038989       .038987       .000000        .000000


 STE     KNNRSE    ISTA     QVPA       FACT

  1       RO28       0     1.00000    1.00000
```

```
--- STSEHN ---

  I  I  CU34      .90434899-02  0    .10000000+01    .10000000+01

--- HDYRHN ---  KORAK   I  ITER   2  IRAINS I  NZSNRE   0  IENTFL I  IBNORM I

--- DIRTHW ---   IKNUBZ       0 JRI       I LBSZ       0 KBZ       0
////////////////////////////////// JBLKSM=     32        4       24        I        6
////////////////////////////////// JBLKSM=     33        3       24        I        6
////////////////////////////////// JBLKSM=     34        2       24        I        6
////////////////////////////////// JBLKSM=     35        1       24        I        6

***MRKCHN*** DRY-WEATHER-FLOW INITIALISATION OK

                 JAI       I LOBBB       I

--- SMNIVB ---   JRP2       I JREZ(JRP2+I)       0 LOBBB       I LIMBO       0
                  JRB2       I

--- DTSET ---   IRN       I JJAHR    I JMONAT    I JTAG    I JINT  216
                  JRB2       5 NOKI       4

*** EESTOH ***   SINGLE EVENT RESULTS OUT

--- DATENA ---   IRN       I
                 IDTENT     I    I    I 216

*** DATMNA ***   NEW DATE  I   I   I 216

--- EFNGER ---   IRAINS    I
EFFNGB(I,I)      0.  EFFNGB(2,I)      0.  EFFNGB(3,I)      0.  EFFNGB(4,I)      0.
EFFNGU(I,I)      0.  EFFNGU(2,I)      0.  EFFNGU(3,I)      0.  EFFNGU(4,I)      0.
--- STSEHN ---

  I  I  CU34      .20217425-02  0    .10000000+01    .10000000+01

--- HDYRHN ---  KORAK   2  ITER   I  IRAINS I  NZSNRE   0  IENTFL I  IBNORM I

--- DIRTHW ---   IKNUBZ       I JRI       2 LBSZ       I KBZ       I
                 JAI       2 LOBBB       2

--- SMNIVB ---   JRP2       I JREZ(JRP2+I)       0 LOBBB       2 LIMBO       0
                  JRB2       5

--- DTSET ---   IRN       I JJAHR    I JMONAT    I JTAG    I JINT  217
                  JRB2       9 NOKI       4

*** EESTOH ***   SINGLE EVENT RESULTS OUT

--- DATENA ---   IRN       I
                 IDTENT     I    I    I 217

*** DATMNA ***   NEW DATE  I   I   I 217

--- EFNGER ---   IRAINS    I
EFFNGB(I,I)   200.  EFFNGB(2,I)      0.  EFFNGB(3,I)      0.  EFFNGB(4,I)      0.
EFFNGU(I,I)      0.  EFFNGU(2,I)      0.  EFFNGU(3,I)      0.  EFFNGU(4,I)      0.
--- STSEHN ---

  I  I  CU34      .10108712-02  0    .10000000+01    .10000000+01
```

```
--- HDYRHN ---  KORAK   3  ITER   1  IRAINS 1  NZSNRE   0  IENTFL 1  IBNORM 1

--- DIRTHQ ---   IKNUBZ      1 JRI      3 LBSZ      2 KBZ      1
                 JAI      3 LOBBB      3

--- SMNIVB ---   JRP2      1 JREZ(JRP2+1)      0 LOBBB      3 LIMBO      0
                  JRB2      9

 DIRT LEVELS (ROUTINE *SMRSET*).  MONTH NUMBER =  1 TIME SINCE STREET-CLEANING =  1224  RAINFALL-AREA NUMBER =  1 DRY-PERIOD=   216
 DIRT LEVELS(OLD,PAVED)-    10.00 15.00 20.00 15.00 75.00 80.00110.00 80.00100.00100.00100.00100.00 50.00 60.00 70.00 60.00
 DIRT LEVELS(OLD,GREEN)-    10.00 15.00 20.00 15.00 75.00 80.00110.00 80.00100.00100.00100.00100.00 50.00 60.00 70.00 60.00


 DIRT LEVELS(NEW,PAVED)-     8.00 12.00 16.00 12.00 60.00 64.00 88.00 64.00 94.00 94.00 94.00 94.00 40.00 48.00 56.00 48.00
 DIRT LEVELS(NEW,GREEN)-     8.00 12.00 16.00 12.00 60.00 64.00 88.00 64.00 94.00 94.00 94.00 94.00 40.00 48.00 56.00 48.00


--- DTSET ---   IRN      1 JJAHR   1 JMONAT   1 JTAG   1 JINT  218
                 JRB2      13 NOK1      4

*** EESTOH ***  SINGLE EVENT RESULTS OUT

--- DATENA ---   IRN      1
                 IDTENT    1    1    1 218

*** DATMNA ***  NEW DATE  1  1  1 218

--- EFNGER ---  IRAINS   1
EFFNGB(1,1)  3200.  EFFNGB(2,1)  3200.  EFFNGB(3,1)  3000.  EFFNGB(4,1)  3200.
EFFNGU(1,1)     0.  EFFNGU(2,1)     0.  EFFNGU(3,1)     0.  EFFNGU(4,1)     0.

--- STSEHN ---

  1  1  CU34      .53999231-04  0    .10000000+01    .10000000+01

--- HDYRHN ---  KORAK   4  ITER  10  IRAINS 1  NZSNRE   0  IENTFL 1  IBNORM 1

--- DIRTHQ ---   IKNUBZ      1 JRI      4 LBSZ      3 KBZ      1
                 JAI      4 LOBBB      4

--- SMNIVB ---   JRP2      1 JREZ(JRP2+1)      0 LOBBB      4 LIMBO      0
                  JRB2      13

--- DTSET ---   IRN      1 JJAHR   1 JMONAT   1 JTAG   1 JINT  219
                 JRB2      17 NOK1      4

*** EESTOH ***  SINGLE EVENT RESULTS OUT

--- DATENA ---   IRN      1
                 IDTENT    1    1    1 219

*** DATMNA ***  NEW DATE  1  1  1 219

--- EFNGER ---  IRAINS   1
EFFNGB(1,1)  2800.  EFFNGB(2,1)  2800.  EFFNGB(3,1)  2800.  EFFNGB(4,1)  2800.
EFFNGU(1,1)     0.  EFFNGU(2,1)     0.  EFFNGU(3,1)     0.  EFFNGU(4,1)     0.

--- STSEHN ---

  1  1  CU34      .83938621-04  0    .10000000+01    .10000000+01
```

```
*** EESTOH ***  SINGLE EVENT RESULTS OUT

--- DATENA ---   IRN      1
                 IDTENT     1    1    1 260

*** DATHNA ***  NEW DATE  1   1   1 260

--- RNLOOP ---  EXIT


                                  END-OF-YEAR TOTAL DIRT WASH-OFFS

 DIRT TYPE  1    TOTAL WASH-OFF =   .899986+03    CATCHMENT-AREA WASH-OFFS =   .427920+02   .358686+03   .493593+03   .491520+01

 DIRT TYPE  2    TOTAL WASH-OFF =   .283508+04    CATCHMENT-AREA WASH-OFFS =   .196815+03   .786111+03   .183721+04   .149450+02

 DIRT TYPE  3    TOTAL WASH-OFF =   .636085+04    CATCHMENT-AREA WASH-OFFS =   .502806+03   .280971+04   .300983+04   .385024+02

 DIRT TYPE  4    TOTAL WASH-OFF =   .364765+04    CATCHMENT-AREA WASH-OFFS =   .213960+03   .143474+04   .197929+04   .196608+02

--- RECOVW ---   RECOVERY WRITE CALLED

*** MNTWKC ***  ALARMS O/P FOLLOWS

   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0

@BRKPT  PRINTS
```

APPENDIX 10

TEST EXAMPLE FOR MNTWSP

NOTE: This example is similar to the example contained on the computer tape.

-Exerpt of output

```
@ASG,AX  •Q95.
@ASG,AX  •IF01.
@ASG,AX  •IF02.
@ASG,AX  •IF03.
@ASG,AX  •IF04.
@ASG,AX  •IF05.
@ASG,AX  •IF06.
@ASG,AX  •IF07.
@ASG,AX  •IF08.
@ASG,AX  •IF09.
@ASG,AX  •IF10.
@ASG,AX  •IF11.
@ASG,AX  •IF12.
@ASG,AX  •IF13.
@ASG,AX  •IF14.
@ASG,AX  •IF15.
@ASG,AX  •IF16.
@ASG,AX  •IF17.
@ASG,AX  •IF18.
@ASG,AX  •IF19.
@ASG,AX  •IF20.
```

```
@ASG,AX  *IF21.

@ASG,AX  *IF22.

@ASG,AX  *IF23.

@ASG,AX  *IF24.

@ASG,AX  *IF25.

@ASG,AX  *IF26.

@USE  11,*IF01.

@USE  12,*IF02.

@USE  13,*IF03.

@USE  15,*IF05.

@USE  16,*IF06.

@USE  17,*IF07.

@USE  18,*IF08.

@USE  19,*IF09.

@USE  20,*IF10.

@USE  21,*IF11.

@USE  22,*IF12.

@USE  23,*IF13.

@USE  24,*IF14.

@USE  25,*IF15.

@USE  26,*IF16.

@USE  27,*IF17.

@XQT  *VQS.MNTASP
```

```
******************************************************
**                      Q   Q   S                   **
**           URBAN RUNOFF AND ITS POLLUTION          **
**              SINGLE EVENT SIMULATION              **
**                      FOR THE                      **
*                   WQS-EPA-EXAMPLE                   *
******************************************************
```

```
****  PIPE RESULTS  ****          PIPE NUMBER     1     UPPER NODE     C001     LOWER NODE  C002

INTERVAL     QU       HU       QD       HD       P1         P2         P3          P4
          (L/SEC)    (M)    (L/SEC)    (M)   (KG/INT)   (KG/INT)  (EIUC/INT)  (KG/INT)

    1         9.      .01       9.      .01      .65        .73      51.86        .93
    2         9.      .01       9.      .01      .65        .73      51.86        .93
    3         9.      .01       9.      .01      .65        .73      51.86        .93
    4        59.      .10      40.      .07     3.45       4.21      64.29      14.92
    5       155.      .25     116.      .19     8.25      11.51      98.12      35.27
    6       170.      .28     157.      .26     9.23      14.44     115.36      35.11
    7       115.      .19     132.      .23     6.32      11.21     101.14      20.95
    8        85.      .14      99.      .17     3.76       8.48      83.49      11.50
    9        74.      .12      81.      .14     2.39       7.09      69.10       7.06
   10        54.      .09      63.      .11     1.65       5.52      61.52       4.44
   11        40.      .06      47.      .08     1.14       4.03      57.02       2.57
   12        34.      .05      38.      .06      .84       3.15      55.82       1.45
   13        32.      .05      33.      .06      .69       2.53      54.78       1.01
   14        30.      .05      31.      .05      .65       2.05      53.40        .93
   15        24.      .04      26.      .04      .65       1.63      52.78        .94
   16        19.      .03      21.      .04      .64       1.26      50.95        .92
   17        14.      .02      17.      .03      .65       1.07      52.22        .94
   18        12.      .02      13.      .02      .65        .92      51.94        .93
   19        10.      .02      11.      .02      .65        .83      51.68        .93
   20        10.      .02      10.      .02      .65        .79      52.14        .94
   21         9.      .01       9.      .02      .65        .77      52.23        .94
   22         9.      .01       9.      .02      .65        .74      51.85        .93
   23         9.      .01       9.      .01      .65        .73      51.82        .93
   24         9.      .01       9.      .01      .65        .73      52.00        .94
   25         9.      .01       9.      .01      .65        .73      51.86        .93
   26         9.      .01       9.      .01      .65        .73      51.87        .93
   27         9.      .01       9.      .01      .65        .73      51.85        .93
   28         9.      .01       9.      .01      .65        .73      51.85        .93
   29         9.      .01       9.      .01      .65        .73      51.85        .93
   30         9.      .01       9.      .01      .65        .73      51.85        .93
   31         9.      .01       9.      .01      .65        .73      51.86        .93
   32         9.      .01       9.      .01      .65        .73      51.86        .93
   33         9.      .01       9.      .01      .65        .73      51.86        .93
   34         9.      .01       9.      .01      .65        .73      51.86        .93
   35         9.      .01       9.      .01      .65        .73      51.86        .93
   36         9.      .01       9.      .01      .65        .73      51.86        .93
   37         9.      .01       9.      .01      .65        .73      51.86        .93
   38         9.      .01       9.      .01      .65        .73      51.86        .93
   39         9.      .01       9.      .01      .65        .73      51.86        .93
   40         9.      .01       9.      .01      .65        .73      51.86        .93
   41         9.      .01       9.      .01      .65        .73      51.86        .93
   42         9.      .01       9.      .01      .65        .73      51.86        .93
   43         9.      .01       9.      .01      .65        .73      51.86        .93
   44         9.      .01       9.      .01      .65        .73      51.86        .93
   45         9.      .01       9.      .01      .65        .73      51.86        .93
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****  PIPE RESULTS  ****          PIPE NUMBER     24      UPPER NODE      R028      LOWER NODE  C029

INTERVAL        QU          HU          QD          HD          P1          P2          P3          P4
             (L/SEC)       (M)      (L/SEC)        (M)      (KG/INT)    (KG/INT)   (EIUC/INT)   (KG/INT)


    1            6.         .01          6.         .01         .45         .50       35.75         .64
    2            6.         .01          6.         .01         .43         .49       34.79         .63
    3            6.         .01          6.         .01         .43         .49       34.75         .63
    4          382.         .95        207.         .44       13.62       33.32       58.80       66.78
    5          248.         .70        274.         .50       28.39       73.49       88.82      141.27
    6          261.         .71        261.         .53       13.33       41.75       68.26       65.25
    7          245.         .68        245.         .59       10.20       35.60       73.82       46.02
    8          244.         .65        244.         .58        8.61       32.99       73.94       31.11
    9          245.         .61        245.         .54        8.78       37.69       75.40       24.01
   10          243.         .56        243.         .50        8.69       41.95       81.77       20.32
   11          241.         .55        241.         .50        7.55       41.73       85.13       14.93
   12          237.         .52        237.         .50        6.20       40.35       85.77        7.34
   13          237.         .52        237.         .50        5.60       38.99       88.21        2.34
   14          236.         .52        236.         .50        4.77       31.35       78.73         .63
   15          205.         .33        210.         .45        3.92       24.42       73.12         .59
   16          153.         .26        180.         .39        2.86       16.98       62.67         .62
   17           75.         .12        123.         .27        1.85       10.81       52.54         .63
   18           44.         .06         75.         .16        1.16        6.37       45.10         .62
   19           19.         .02         40.         .09         .80        3.86       39.83         .61
   20           12.         .01         21.         .05         .61        2.50       37.59         .62
   21            7.         .01         12.         .03         .51        1.64       36.74         .63
   22            6.         .01          8.         .02         .45        1.08       35.56         .62
   23            6.         .01          6.         .01         .44         .77       35.39         .63
   24            6.         .01          6.         .01         .45         .61       36.17         .65
   25            6.         .01          6.         .01         .44         .52       35.10         .63
   26            6.         .01          6.         .01         .44         .49       34.97         .63
   27            6.         .01          6.         .01         .43         .49       34.80         .63
   28            6.         .01          6.         .01         .43         .49       34.78         .63
   29            6.         .01          6.         .01         .43         .49       34.78         .63
   30            6.         .01          6.         .01         .43         .49       34.77         .63
   31            6.         .01          6.         .01         .43         .49       34.77         .63
   32            6.         .01          6.         .01         .43         .49       34.77         .63
   33            6.         .01          6.         .01         .43         .49       34.77         .63
   34            6.         .01          6.         .01         .43         .49       34.77         .63
   35            6.         .01          6.         .01         .43         .49       34.77         .63
   36            6.         .01          6.         .01         .43         .49       34.77         .63
   37            6.         .01          6.         .01         .43         .49       34.77         .63
   38            6.         .01          6.         .01         .43         .49       34.77         .63
   39            6.         .01          6.         .01         .43         .49       34.77         .63
   40            6.         .01          6.         .01         .43         .49       34.77         .63
   41            6.         .01          6.         .01         .43         .49       34.77         .63
   42            6.         .01          6.         .01         .43         .49       34.77         .63
   43            6.         .01          6.         .01         .43         .49       34.77         .63
   44            6.         .01          6.         .01         .43         .49       34.77         .63
   45            6.         .01          6.         .01         .43         .49       34.77         .63
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****  PIPE RESULTS  ****          PIPE NUMBER     25     UPPER NODE      CU29      LOWER NODE  CO30

INTERVAL        QU        HU        QD          HD        P1          P2          P3           P4
             (L/SEC)     (M)     (L/SEC)       (M)    (KG/INT)    (KG/INT)   (EIUC/INT)   (KG/INT)

    1           6.       .01        6.         .01        .42         .47       33.92         .61
    2           6.       .00        6.         .01        .43         .48       34.28         .62
    3           6.       .00        6.         .01        .43         .48       34.09         .61
    4         207.       .20      117.         .23       5.73       13.64       46.17       27.12
    5         274.       .32      211.         .41      20.13       50.95       72.69       99.58
    6         261.       .55      244.         .47      22.18       60.56       80.87      109.93
    7         245.       .60      245.         .48      11.77       38.37       69.14       56.00
    8         244.       .59      244.         .48       9.55       34.53       73.87       39.89
    9         245.       .56      245.         .48       8.78       35.32       75.33       28.44
   10         243.       .32      244.         .48       8.84       40.05       79.18       22.72
   11         241.       .32      242.         .47       8.16       41.82       83.16       17.96
   12         237.       .31      239.         .47       6.96       41.13       85.40       11.64
   13         237.       .31      238.         .46       5.94       39.75       86.79        5.17
   14         236.       .31      237.         .46       5.24       35.67       84.09        1.60
   15         210.       .28      223.         .44       4.40       28.37       76.36         .61
   16         180.       .24      199.         .39       3.46       21.19       68.60         .60
   17         123.       .16      158.         .31       2.42       14.28       58.20         .62
   18          75.       .09      110.         .22       1.53        8.78       48.61         .62
   19          40.       .04       68.         .14        .98        5.19       41.55         .60
   20          21.       .02       38.         .08        .71        3.25       37.59         .59
   21          12.       .01       21.         .04        .53        2.04       33.75         .56
   22           8.       .00       12.         .02        .50        1.51       36.67         .63
   23           6.       .00        8.         .02        .44         .99       34.94         .61
   24           6.       .00        7.         .01        .44         .73       35.69         .63
   25           6.       .00        6.         .01        .46         .60       36.76         .66
   26           6.       .00        6.         .01        .46         .53       36.34         .65
   27           6.       .00        6.         .01        .44         .50       35.23         .63
   28           6.       .00        6.         .01        .44         .49       34.96         .63
   29           6.       .00        6.         .01        .44         .49       34.87         .63
   30           6.       .00        6.         .01        .43         .49       34.79         .63
   31           6.       .00        6.         .01        .43         .49       34.78         .63
   32           6.       .00        6.         .01        .43         .49       34.78         .63
   33           6.       .00        6.         .01        .43         .49       34.77         .63
   34           6.       .00        6.         .01        .43         .49       34.77         .63
   35           6.       .00        6.         .01        .43         .49       34.77         .63
   36           6.       .00        6.         .01        .43         .49       34.77         .63
   37           6.       .00        6.         .01        .43         .49       34.77         .63
   38           6.       .00        6.         .01        .43         .49       34.77         .63
   39           6.       .00        6.         .01        .43         .49       34.77         .63
   40           6.       .00        6.         .01        .43         .49       34.77         .63
   41           6.       .00        6.         .01        .43         .49       34.77         .63
   42           6.       .00        6.         .01        .43         .49       34.77         .63
   43           6.       .00        6.         .01        .43         .49       34.77         .63
   44           6.       .00        6.         .01        .43         .49       34.77         .63
   45           6.       .00        6.         .01        .43         .49       34.77         .63
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****  PIPE RESULTS  ****          PIPE NUMBER     29     UPPER NODE      C033      LOWER NODE  C034

INTERVAL       QU        HU        QD         HD        P1          P2          P3           P4
            (L/SEC)     (M)     (L/SEC)      (M)    (KG/INT)    (KG/INT)   (EIOC/INT)   (KG/INT)

    1          38.       .00        36.       .01       1.53        1.71      122.19         2.20
    2          38.       .00        39.       .01       1.12        1.25       89.50         1.61
    3          43.       .00        43.       .01       1.40        1.57      112.08         2.02
    4         309.       .00       273.       .08       1.95        2.18      155.08         2.84
    5         875.       .00       795.       .25       8.90       10.80      240.04        34.61
    6        1175.       .00      1124.       .35      29.60       40.88      367.46       126.58
    7        1101.       .00      1104.       .34      52.01       86.14      534.85       212.80
    8         966.       .00       984.       .30      52.37      117.32      585.51       221.35
    9         857.       .00       874.       .27      45.21      124.19      548.80       199.35
   10         732.       .00       750.       .23      33.81      104.75      480.38       144.85
   11         636.       .00       650.       .20      23.35       84.06      409.27        91.41
   12         572.       .00       583.       .18      18.59       73.42      359.87        65.19
   13         541.       .00       547.       .17      16.41       67.92      312.12        51.97
   14         522.       .00       525.       .16      15.67       66.67      277.33        47.73
   15         488.       .00       493.       .15      15.18       64.30      258.09        45.21
   16         445.       .00       451.       .14      14.96       62.09      254.68        42.40
   17         388.       .00       397.       .12      14.42       56.38      248.67        38.96
   18         329.       .00       338.       .10      14.01       48.82      240.71        38.10
   19         272.       .00       281.       .09      14.24       42.40      245.58        41.00
   20         226.       .00       234.       .07      14.39       36.21      248.82        44.50
   21         191.       .00       196.       .06      14.10       30.60      243.40        46.29
   22         168.       .00       172.       .05      13.79       26.66      241.03        47.15
   23         155.       .00       157.       .05      12.74       22.98      234.73        43.99
   24         150.       .00       151.       .05      10.21       17.98      207.99        34.53
   25         146.       .00       146.       .05       7.65       13.71      187.36        24.30
   26         144.       .00       145.       .04       6.31       11.57      180.37        18.76
   27         143.       .00       143.       .04       6.62       12.50      186.77        19.60
   28         143.       .00       143.       .04       8.07       15.87      212.37        24.54
   29         142.       .00       142.       .04       9.20       18.68      233.39        28.35
   30         141.       .00       141.       .04       8.97       19.01      232.36        27.56
   31         141.       .00       141.       .04       7.63       17.27      217.26        22.85
   32         140.       .00       140.       .04       6.13       14.95      199.95        17.57
   33         140.       .00       140.       .04       4.91       12.58      184.55        13.29
   34         139.       .00       139.       .04       4.12       10.93      176.58        10.44
   35         138.       .00       138.       .04       3.92       11.06      182.00         9.41
   36         135.       .00       136.       .04       4.08       12.47      198.08         9.49
   37         129.       .00       130.       .04       4.10       13.41      213.42         9.09
   38         122.       .00       123.       .04       3.75       12.83      218.56         7.64
   39         112.       .00       113.       .04       3.38       11.68      223.21         6.17
   40         102.       .00       104.       .03       3.09       10.22      224.80         5.11
   41          94.       .00        95.       .03       3.01        9.12      231.06         4.65
   42          87.       .00        88.       .03       3.04        8.03      240.00         4.51
   43          80.       .00        81.       .03       3.27        7.35      260.06         4.75
   44          75.       .00        76.       .02       3.67        6.98      293.60         5.29
   45          70.       .00        70.       .02       4.21        6.79      337.24         6.07
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****  PIPE RESULTS  ****          PIPE NUMBER    30    UPPER NODE    C034    LOWER NODE  C035

INTERVAL     QU        HU       QD        HD       P1        P2         P3         P4
          (L/SEC)     (M)    (L/SEC)     (M)   (KG/INT)  (KG/INT)  (EIUC/INT)  (KG/INT)


    1        36.      .00       35.      .01       .92      1.03      73.83      1.33
    2        39.      .00       39.      .01      1.25      1.40     100.13      1.80
    3        43.      .00       42.      .02      1.05      1.18      84.30      1.52
    4       273.      .00      231.      .09      1.31      1.47     104.95      1.89
    5       795.      .00      695.      .27      1.95      2.19     155.07      2.84
    6      1124.      .00     1048.      .41      8.90     10.80     240.00     34.61
    7      1104.      .00     1094.      .43     29.60     40.88     367.45    126.57
    8       984.      .00     1003.      .39     52.03     86.18     535.07    212.89
    9       874.      .00      897.      .35     52.36    117.28     585.34    221.29
   10       750.      .00      776.      .30     45.31    124.50     550.24    199.78
   11       650.      .00      672.      .26     34.01    105.52     484.23    145.59
   12       583.      .00      598.      .23     23.25     83.79     407.98     90.95
   13       547.      .00      556.      .22     18.50     73.12     358.23     64.86
   14       525.      .00      530.      .21     16.43     68.01     312.24     52.00
   15       493.      .00      500.      .20     15.55     66.14     275.11     47.35
   16       451.      .00      460.      .18     15.34     64.98     260.89     45.67
   17       397.      .00      408.      .16     14.93     61.90     254.07     42.27
   18       338.      .00      350.      .14     14.45     56.42     249.16     39.04
   19       281.      .00      294.      .11     14.26     49.47     245.03     38.85
   20       234.      .00      245.      .09     14.31     42.38     246.85     41.31
   21       196.      .00      204.      .08     14.12     35.45     244.08     43.70
   22       172.      .00      178.      .07     14.19     30.71     244.98     46.62
   23       157.      .00      160.      .06     13.90     26.82     243.37     47.59
   24       151.      .00      153.      .06     12.44     22.44     229.52     42.96
   25       146.      .00      147.      .06     10.18     17.94     207.90     34.43
   26       145.      .00      146.      .06      7.58     13.58     185.73     24.07
   27       143.      .00      144.      .06      6.32     11.58     180.42     18.76
   28       143.      .00      143.      .06      6.61     12.49     186.59     19.59
   29       142.      .00      142.      .06      8.06     15.85     212.02     24.50
   30       141.      .00      142.      .06      9.20     18.68     233.47     28.36
   31       141.      .00      141.      .06      8.97     19.01     232.31     27.55
   32       140.      .00      141.      .06      7.63     17.27     217.23     22.84
   33       140.      .00      140.      .05      6.13     14.94     199.81     17.55
   34       139.      .00      139.      .05      4.91     12.58     184.63     13.29
   35       138.      .00      139.      .05      4.13     10.94     176.69     10.45
   36       136.      .00      136.      .05      3.93     11.10     182.72      9.45
   37       130.      .00      131.      .05      4.11     12.57     199.57      9.54
   38       123.      .00      125.      .05      4.07     13.31     211.90      9.02
   39       113.      .00      115.      .05      3.78     12.92     220.38      7.69
   40       104.      .00      106.      .04      3.38     11.68     223.59      6.17
   41        95.      .00       97.      .04      3.09     10.21     224.98      5.11
   42        88.      .00       90.      .04      3.01      9.11     231.13      4.65
   43        81.      .00       83.      .03      3.04      8.01     240.14      4.51
   44        76.      .00       77.      .03      3.27      7.34     261.08      4.75
   45        70.      .00       71.      .03      3.72      7.05     297.89      5.37
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****  PIPE RESULTS  ****            PIPE NUMBER     33     UPPER NODE     C037     LOWER NODE  R038

INTERVAL       QU        HU        QD         HD       P1          P2          P3          P4
            (L/SEC)     (M)     (L/SEC)      (M)    (KG/INT)    (KG/INT)   (EIUC/INT)   (KG/INT)

    1          33.      .01        32.       .02      1.23        1.37       98.19        1.77
    2          40.      .00        40.       .02      1.14        1.28       91.28        1.64
    3          41.      .00        40.       .02      1.07        1.19       85.22        1.53
    4         218.      .00       170.       .09       .79         .89       63.10        1.16
    5         670.      .04       520.       .28      9.21       21.90      119.55       41.63
    6        1019.      .15       836.       .45     15.44       44.69      172.18       71.63
    7        1153.      .23      1031.       .56     11.71       35.83      213.04       48.05
    8        1013.     1.08       996.       .56     17.23       41.98      367.93       61.21
    9         984.      .43      1034.       .55     47.96       82.28      553.22      194.96
   10        1055.      .22      1031.       .56     28.41       51.35      310.48      114.77
   11         844.      .16       924.       .50     34.47       76.20      376.14      140.30
   12         704.      .11       789.       .42     46.50      115.90      537.59      195.98
   13         630.      .07       689.       .37     39.04      113.19      494.29      168.15
   14         585.      .05       622.       .34     30.82       99.96      454.99      127.67
   15         544.      .03       572.       .31     21.66       80.12      385.10       81.98
   16         505.      .02       530.       .28     17.94       71.80      348.05       61.25
   17         447.      .01       475.       .26     15.91       66.29      303.94       49.62
   18         392.      .00       414.       .22     15.73       67.07      281.39       47.47
   19         337.      .01       360.       .19     15.79       66.81      272.33       46.61
   20         281.      .01       301.       .16     15.45       63.69      267.19       43.43
   21         231.      .00       246.       .13     14.51       56.02      254.03       39.15
   22         200.      .00       213.       .11     14.23       48.66      248.67       36.91
   23         175.      .01       185.       .10     14.56       42.36      255.18       42.25
   24         161.      .00       166.       .09     14.01       34.66      245.84       43.49
   25         152.      .00       156.       .08     13.98       29.97      245.58       45.97
   26         149.      .00       151.       .08     13.41       25.76      238.95       45.75
   27         146.      .00       147.       .08     12.31       22.15      231.46       42.36
   28         145.      .00       145.       .08     10.08       17.72      209.90       33.92
   29         144.      .00       144.       .08      7.58       13.56      189.58       23.97
   30         143.      .00       143.       .08      6.35       11.61      184.62       18.78
   31         142.      .00       143.       .08      6.67       12.55      191.24       19.67
   32         142.      .00       142.       .08      8.13       15.93      217.01       24.61
   33         141.      .00       141.       .08      9.25       18.73      238.07       28.41
   34         141.      .00       141.       .08      9.02       19.06      237.11       27.61
   35         140.      .00       140.       .08      7.69       17.33      222.10       22.91
   36         138.      .00       139.       .07      6.20       15.04      205.29       17.67
   37         135.      .00       136.       .07      5.00       12.73      191.08       13.45
   38         129.      .00       131.       .07      4.19       11.04      182.18       10.55
   39         122.      .00       125.       .07      4.03       11.29      189.39        9.61
   40         113.      .00       116.       .06      4.19       12.72      205.90        9.67
   41         104.      .00       107.       .06      4.17       13.51      219.52        9.15
   42          96.      .00        99.       .05      3.83       12.97      226.06        7.73
   43          88.      .00        91.       .05      3.43       11.68      228.55        6.21
   44          82.      .00        84.       .05      3.14       10.22      229.82        5.17
   45          76.      .00        78.       .04      3.11        9.23      239.59        4.79
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****  PIPE RESULTS  ****                PIPE NUMBER     34     UPPER NODE     R038     LOWER NODE  B038

INTERVAL      QU         HU        QD         HD        P1          P2          P3           P4
           (L/SEC)      (M)     (L/SEC)      (M)    (KG/INT)    (KG/INT)   (EIUC/INT)   (KG/INT)

    1        32.        .08       33.        .10      1.92        2.15       153.51        2.76
    2        40.        .09       38.        .11      1.16        1.30        92.92        1.67
    3        40.        .09       39.        .12      1.09        1.22        87.35        1.57
    4       170.        .38      124.        .39       .89        1.00        71.32        1.30
    5       231.        .65      212.        .50      3.11        6.95        64.79       12.96
    6       234.        .69      234.        .50      4.45       12.19        52.05       20.48
    7       241.        .71      241.        .50      3.20        9.59        49.68       13.77
    8       240.        .71      240.        .50      3.76        9.61        77.84       13.75
    9       241.        .71      241.        .50      9.26       16.71       117.95       37.07
   10       241.        .71      241.        .50      7.06       13.94        67.78       31.85
   11       237.        .70      237.        .50      8.21       17.43        89.64       33.37
   12       232.        .68      232.        .50     12.29       29.95       140.52       51.45
   13       229.        .67      229.        .50     13.11       36.46       161.82       56.14
   14       226.        .66      226.        .50     11.66       36.56       164.42       48.93
   15       224.        .66      224.        .50      9.24       32.72       154.57       36.14
   16       222.        .65      222.        .50      7.78       30.38       146.89       27.48
   17       219.        .65      219.        .50      7.37       30.36       141.54       23.65
   18       216.        .64      216.        .50      7.92       33.55       144.32       24.12
   19       213.        .63      213.        .50      8.96       38.01       156.18       26.62
   20       209.        .61      209.        .50     10.25       42.57       177.13       29.22
   21       205.        .60      205.        .50     11.58       45.58       202.01       31.62
   22       202.        .59      202.        .50     12.98       46.06       226.84       35.33
   23       185.        .55      187.        .49     13.94       42.77       244.09       39.72
   24       166.        .52      168.        .50     13.58       35.76       238.25       41.16
   25       156.        .50      158.        .49     13.77       31.29       241.79       44.28
   26       151.        .50      152.        .48     13.56       27.30       240.23       45.57
   27       147.        .50      149.        .47     12.78       23.65       234.88       43.81
   28       145.        .50      146.        .46     10.98       19.51       218.57       37.33
   29       144.        .50      145.        .46      8.60       15.25       197.92       28.02
   30       143.        .50      144.        .45      6.85       12.40       186.70       20.89
   31       143.        .50      143.        .45      6.54       12.17       188.61       19.31
   32       142.        .50      142.        .45      7.54       14.57       206.66       22.62
   33       141.        .50      142.        .45      8.80       17.60       229.59       26.88
   34       141.        .50      141.        .44      9.12       18.94       237.59       27.95
   35       140.        .50      140.        .44      8.23       18.03       228.23       24.82
   36       139.        .50      140.        .44      6.81       16.00       212.58       19.83
   37       136.        .50      138.        .43      5.51       13.73       197.84       15.21
   38       131.        .38      132.        .42      4.40       11.42       180.93       11.42
   39       125.        .35      128.        .40      4.11       11.21       166.76       10.02
   40       116.        .33      120.        .37      4.13       12.13       199.17        9.65
   41       107.        .30      111.        .35      4.18       13.18       213.78        9.36
   42        99.        .28      103.        .32      3.97       13.18       223.12        8.32
   43        91.        .25       95.        .30      3.59       12.21       227.20        6.84
   44        84.        .23       68.        .27      3.26       10.82       228.92        5.60
   45        78.        .22       81.        .25      3.14        9.69       236.69        4.98
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****  PIPE RESULTS  ****            PIPE NUMBER    35     UPPER NODE     B038     LOWER NODE  C039

INTERVAL      QU         HU         QD          HD        P1         P2          P3          P4
           (L/SEC)      (M)       (L/SEC)      (M)     (KG/INT)   (KG/INT)   (E10C/INT)   (KG/INT)

    1         33.       .01         32.        .03       1.62       1.82      129.81        2.34
    2         38.       .01         37.        .03       1.38       1.55      110.58        1.99
    3         39.       .00         38.        .03       1.04       1.17       83.58        1.50
    4        124.       .02         89.        .08       1.18       1.32       94.36        1.70
    5        156.       .05        127.        .12       1.20       1.88       67.05        3.04
    6        156.       .06        143.        .14       1.72       3.66       35.91        7.24
    7        157.       .07        151.        .14       2.19       4.55       37.65        9.71
    8        158.       .07        155.        .15       2.38       5.26       33.95       10.79
    9        159.       .07        157.        .15       2.00       4.59       33.87        8.68
   10        160.       .07        159.        .15       2.01       4.38       42.42        7.94
   11        161.       .07        160.        .15       3.16       5.43       59.88       12.12
   12        162.       .07        161.        .15       4.82       7.12       73.06       19.17
   13        162.       .07        162.        .15       5.13       7.24       69.46       20.65
   14        163.       .08        162.        .16       4.92       7.41       62.02       19.94
   15        164.       .08        163.        .16       5.60       9.61       70.64       22.91
   16        164.       .08        164.        .16       6.98      13.09       90.14       29.02
   17        165.       .08        164.        .16       8.17      16.89      110.78       34.59
   18        166.       .08        165.        .16       8.20      18.74      120.44       34.86
   19        166.       .08        166.        .16       7.48      18.58      121.27       31.16
   20        166.       .08        166.        .16       6.61      17.81      119.52       26.39
   21        167.       .08        166.        .16       5.72      16.83      115.99       21.27
   22        167.       .08        167.        .16       5.21      16.45      112.89       17.73
   23        167.       .08        167.        .16       5.32      17.40      114.26       16.90
   24        167.       .08        167.        .16       5.80      19.35      120.43       17.74
   25        167.       .08        167.        .16       6.49      21.68      130.19       19.28
   26        167.       .08        167.        .16       7.30      24.07      144.25       21.05
   27        167.       .08        167.        .16       8.21      26.16      162.59       22.85
   28        166.       .08        167.        .16       9.17      27.09      182.78       25.02
   29        166.       .08        166.        .16      10.11      26.21      203.09       28.07
   30        166.       .08        166.        .16      10.85      24.05      220.55       31.56
   31        166.       .08        166.        .16      11.46      21.73      234.18       35.25
   32        166.       .08        166.        .16      11.95      19.77      245.10       38.81
   33        165.       .08        166.        .16      11.98      17.86      249.50       40.37
   34        165.       .08        165.        .16      11.16      15.67      243.64       38.06
   35        165.       .08        165.        .16       9.28      12.88      225.43       30.97
   36        165.       .08        165.        .16       7.30      10.34      208.65       23.01
   37        164.       .08        165.        .16       6.53       9.55      207.88       19.59
   38        164.       .08        164.        .16       7.17      10.92      225.33       21.49
   39        164.       .08        164.        .16       8.31      13.15      250.30       25.27
   40        163.       .08        164.        .16       8.67      14.34      262.38       26.42
   41        163.       .08        163.        .16       7.88      13.83      256.24       23.57
   42        162.       .08        162.        .16       6.44      12.16      240.48       18.43
   43        161.       .08        162.        .15       5.16      10.41      228.03       13.75
   44        160.       .07        161.        .15       4.64      10.02      235.59       11.46
   45        160.       .07        160.        .15       4.79      11.27      266.69       11.11
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****  PIPE RESULTS  ****            PIPE NUMBER     15     UPPER NODE     5013     LOWER NODE  5014

INTERVAL      QU         HU        QD        HD        P1          P2          P3          P4
           (L/SEC)      (M)     (L/SEC)     (M)    (KG/INT)    (KG/INT)   (EIOC/INT)   (KG/INT)

    1         5.        .02        5.       .02       .40         .44        31.66        .57
    2         5.        .02        5.       .02       .40         .44        31.66        .57
    3         5.        .02        5.       .02       .40         .44        31.66        .57
    4         5.        .02        5.       .02       .40         .44        31.66        .57
    5         5.        .02        5.       .02       .40         .44        31.66        .57
    6         5.        .02        5.       .02       .40         .44        31.66        .57
    7         5.        .02        5.       .02       .40         .44        31.66        .57
    8         5.        .02        5.       .02       .40         .44        31.66        .57
    9         5.        .02        5.       .02       .40         .44        31.66        .57
   10         5.        .02        5.       .02       .40         .44        31.66        .57
   11         5.        .02        5.       .02       .40         .44        31.66        .57
   12         5.        .02        5.       .02       .40         .44        31.66        .57
   13         5.        .02        5.       .02       .40         .44        31.66        .57
   14         5.        .02        5.       .02       .40         .44        31.66        .57
   15         5.        .02        5.       .02       .40         .44        31.66        .57
   16         5.        .02        5.       .02       .40         .44        31.66        .57
   17         5.        .02        5.       .02       .40         .44        31.66        .57
   18         5.        .02        5.       .02       .40         .44        31.66        .57
   19         5.        .02        5.       .02       .40         .44        31.66        .57
   20         5.        .02        5.       .02       .40         .44        31.66        .57
   21         5.        .02        5.       .02       .40         .44        31.66        .57
   22         5.        .02        5.       .02       .40         .44        31.66        .57
   23         5.        .02        5.       .02       .40         .44        31.66        .57
   24         5.        .02        5.       .02       .40         .44        31.66        .57
   25         5.        .02        5.       .02       .40         .44        31.66        .57
   26         5.        .02        5.       .02       .40         .44        31.66        .57
   27         5.        .02        5.       .02       .40         .44        31.66        .57
   28         5.        .02        5.       .02       .40         .44        31.66        .57
   29         5.        .02        5.       .02       .40         .44        31.66        .57
   30         5.        .02        5.       .02       .40         .44        31.66        .57
   31         5.        .02        5.       .02       .40         .44        31.66        .57
   32         5.        .02        5.       .02       .40         .44        31.66        .57
   33         5.        .02        5.       .02       .40         .44        31.66        .57
   34         5.        .02        5.       .02       .40         .44        31.66        .57
   35         5.        .02        5.       .02       .40         .44        31.66        .57
   36         5.        .02        5.       .02       .40         .44        31.66        .57
   37         5.        .02        5.       .02       .40         .44        31.66        .57
   38         5.        .02        5.       .02       .40         .44        31.66        .57
   39         5.        .02        5.       .02       .40         .44        31.66        .57
   40         5.        .02        5.       .02       .40         .44        31.66        .57
   41         5.        .02        5.       .02       .40         .44        31.66        .57
   42         5.        .02        5.       .02       .40         .44        31.66        .57
   43         5.        .02        5.       .02       .40         .44        31.66        .57
   44         5.        .02        5.       .02       .40         .44        31.66        .57
   45         5.        .02        5.       .02       .40         .44        31.66        .57
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        **** BASIN RESULTS ****              BASIN NUMBER          1        NODE   8006

INT     H    VOL    QIN    QOT    QOV    PIN1    PIN2    PIN3    PIN4    POT1    POT2    POT3    POT4    POV1    POV2    POV3    POV4
      (M)  CUB.M  L/SEC  L/SEC  L/SEC    (KG)    (KG)  (EIOC)    (KG)    (KG)    (KG)  (EIOC)    (KG)    (KG)    (KG)  (EIOC)    (KG)

  1   .05    38.    18.    18.     0.      .9     1.0    72.0     1.3     1.4     1.6   111.1     2.0      .0      .0      .0      .0
  2   .05    38.    19.    18.     0.     1.3     1.4   101.0     1.8     1.4     1.6   110.9     2.0      .0      .0      .0      .0
  3   .05    38.    18.    18.     0.     1.3     1.5   105.9     1.9     1.4     1.6   110.9     2.0      .0      .0      .0      .0
  4   .11    90.   219.    45.     0.    15.0    18.5   168.3    70.4     1.4     1.6   113.6     2.0      .0      .0      .0      .0
  5   .30   243.   631.   121.     0.    33.9    48.5   316.9   146.8     2.2     2.5   179.2     3.2      .0      .0      .0      .0
  6   .54   433.   755.   122.     0.    53.3    84.2   534.9   207.4     1.9     2.2   155.1     2.8      .0      .0      .0      .0
  7   .71   567.   568.   124.     0.    14.4    27.8   190.9    48.2     1.8     2.1   147.1     2.6      .0      .0      .0      .0
  8   .82   659.   434.   126.     0.    26.6    58.6   385.4    90.9     3.6     4.3   137.3    12.2      .0      .0      .0      .0
  9   .91   731.   368.   127.     0.    10.1    32.5   192.6    33.2     5.6     6.9    62.6    26.2      .0      .0      .0      .0
 10   .97   775.   274.   128.     0.     3.7    14.2    91.9    11.4     5.8     7.2    65.3    27.3      .0      .0      .0      .0
 11  1.00   798.   202.   128.     0.     5.0    20.8   151.9    14.2     7.6    10.5    73.2    33.2      .0      .0      .0      .0
 12  1.01   808.   163.   128.     0.     3.1    15.4   134.9     7.4     8.2    11.7    76.3    35.4      .0      .0      .0      .0
 13  1.02   814.   146.   128.     0.     2.0    11.7   125.7     3.9     8.2    11.8    76.9    35.6      .0      .0      .0      .0
 14  1.02   815.   133.   126.     0.     1.7     9.6   122.5     3.0     8.3    11.8    77.3    35.8      .0      .0      .0      .0
 15  1.01   809.   108.   128.     0.     1.5     7.2   115.6     2.3    10.6    16.3   104.3    42.6      .0      .0      .0      .0
 16   .99   795.    83.   128.     0.     1.5     5.6   116.7     2.1    12.1    19.1   121.1    46.9      .0      .0      .0      .0
 17   .97   776.    61.   128.     0.     1.4     4.2   111.2     2.0    12.1    19.2   121.8    47.2      .0      .0      .0      .0
 18   .94   751.    46.   127.     0.     1.4     3.4   111.4     2.0    12.2    19.2   122.1    47.3      .0      .0      .0      .0
 19   .91   724.    37.   127.     0.     1.4     2.9   111.7     2.0    10.3    16.6   106.6    39.8      .0      .0      .0      .0
 20   .87   695.    31.   126.     0.     1.4     2.6   109.2     2.0     4.0     7.6    52.6    13.3      .0      .0      .0      .0
 21   .83   665.    26.   126.     0.     1.4     2.3   109.2     2.0     3.9     7.6    52.4    13.2      .0      .0      .0      .0
 22   .79   635.    23.   125.     0.     1.4     2.0   111.6     2.0     3.9     7.6    52.3    13.2      .0      .0      .0      .0
 23   .75   603.    20.   125.     0.     1.4     1.8   111.1     2.0     6.8    14.6    97.3    23.3      .0      .0      .0      .0
 24   .71   572.    19.   124.     0.     1.4     1.7   111.6     2.0     8.9    19.6   129.3    30.5      .0      .0      .0      .0
 25   .68   541.    19.   124.     0.     1.4     1.6   111.8     2.0     8.9    19.6   128.8    30.3      .0      .0      .0      .0
 26   .64   509.    19.   123.     0.     1.4     1.6   111.7     2.0     5.9    15.3    95.7    19.8      .0      .0      .0      .0
 27   .60   478.    19.   123.     0.     1.4     1.6   111.5     2.0     3.9    12.3    73.2    12.6      .0      .0      .0      .0
 28   .56   447.    19.   122.     0.     1.4     1.6   111.3     2.0     3.8    12.3    72.8    12.5      .0      .0      .0      .0
 29   .52   416.    19.   121.     0.     1.4     1.6   111.2     2.0     1.9     7.1    45.8     5.8      .0      .0      .0      .0
 30   .48   386.    19.   121.     0.     1.4     1.6   111.1     2.0     1.8     6.9    44.5     5.5      .0      .0      .0      .0
 31   .44   355.    19.   120.     0.     1.4     1.6   111.1     2.0     3.1    12.5    91.2     8.7      .0      .0      .0      .0
 32   .41   325.    19.   120.     0.     1.4     1.6   111.1     2.0     2.9    12.7    98.7     7.9      .0      .0      .0      .0
 33   .37   294.    19.   119.     0.     1.4     1.6   111.1     2.0     2.3    11.8   103.6     5.6      .0      .0      .0      .0
 34   .33   264.    19.   119.     0.     2.0     2.7   160.2     2.9     1.7     9.9   106.7     3.3      .0      .0      .0      .0
 35   .29   235.    19.   116.     0.     1.4     1.6   111.1     2.0     1.6     8.9   110.1     2.8      .0      .0      .0      .0
 36   .26   209.    19.   105.     0.     1.4     1.6   111.1     2.0     1.4     7.3   109.6     2.3      .0      .0      .0      .0
 37   .23   186.    19.    95.     0.     1.4     1.6   111.1     2.0     1.5     6.3   120.5     2.2      .0      .0      .0      .0
 38   .21   167.    19.    83.     0.     1.4     1.6   111.1     2.0     1.7     5.4   135.0     2.4      .0      .0      .0      .0
 39   .19   150.    19.    75.     0.     1.4     1.6   111.1     2.0     2.2     5.3   180.1     3.2      .0      .0      .0      .0
 40   .17   135.    19.    68.     0.     1.4     1.6   111.1     2.0     2.8     5.2   220.6     4.0      .0      .0      .0      .0
 41   .15   122.    19.    61.     0.     1.4     1.6   111.1     2.0     3.4     4.8   272.6     4.9      .0      .0      .0      .0
 42   .14   111.    19.    55.     0.     1.4     1.6   111.1     2.0     3.6     4.2   286.3     5.2      .0      .0      .0      .0
 43   .13   102.    19.    51.     0.     1.4     1.6   111.1     2.0     3.3     3.7   263.7     4.7      .0      .0      .0      .0
 44   .12    93.    19.    46.     0.     1.4     1.6   111.1     2.0     3.0     3.3   239.0     4.3      .0      .0      .0      .0
 45   .11    86.    19.    43.     0.     1.4     1.6   111.1     2.0     2.8     3.1   220.1     4.0      .0      .0      .0      .0
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     ****  BASIN RESULTS  ****                    BASIN NUMBER         2       NODE   8038

INT    H     VOL    QIN    QOT    QOV     PIN1    PIN2    PIN3    PIN4    POT1    POT2    POT3    POT4    POV1    POV2    POV3    POV4
      (M)  CUB.M L/SEC  L/SEC  L/SEC    (KG)    (KG)  (EIOC)    (KG)    (KG)    (KG)  (EIOC)    (KG)    (KG)    (KG)  (EIOC)    (KG)

  1   .00     0.    33.    33.     0.     1.9     2.1   153.5     2.8     1.9     2.1   153.5     2.8      .0      .0      .0      .0
  2   .00     0.    38.    38.     0.     1.2     1.3    92.9     1.7     1.2     1.3    92.9     1.7      .0      .0      .0      .0
  3   .00     0.    39.    39.     0.     1.1     1.2    87.4     1.6     1.1     1.2    87.4     1.6      .0      .0      .0      .0
  4   .00     0.   124.   124.     0.      .9     1.0    71.3     1.3      .9     1.0    71.3     1.3      .0      .0      .0      .0
  5   .03    17.   212.   156.     0.     3.1     6.9    64.8    13.0     1.5     3.3    30.4     6.1      .0      .0      .0      .0
  6   .08    40.   234.   156.     0.     4.4    12.2    52.0    20.5     1.8     3.7    38.7     7.9      .0      .0      .0      .0
  7   .13    64.   241.   157.     0.     3.2     9.6    49.7    13.8     2.5     5.5    33.7    11.7      .0      .0      .0      .0
  8   .18    89.   240.   158.     0.     3.8     9.6    77.8    13.8     2.1     4.7    32.8     9.2      .0      .0      .0      .0
  9   .23   114.   241.   159.     0.     9.3    16.7   118.0    37.1     1.9     4.3    34.6     7.9      .0      .0      .0      .0
 10   .27   137.   241.   160.     0.     7.9    13.9    87.8    31.8     2.2     4.4    51.3     8.0      .0      .0      .0      .0
 11   .32   159.   237.   161.     0.     8.2    17.4    89.6    33.4     4.3     6.6    69.6    16.9      .0      .0      .0      .0
 12   .36   178.   232.   162.     0.    12.3    29.9   140.5    51.5     5.4     7.7    76.6    21.6      .0      .0      .0      .0
 13   .39   197.   229.   162.     0.    13.1    36.5   161.8    56.1     4.8     6.7    61.0    19.4      .0      .0      .0      .0
 14   .43   213.   226.   163.     0.    11.7    36.6   164.4    48.9     5.0     8.2    63.1    20.5      .0      .0      .0      .0
 15   .46   231.   224.   164.     0.     9.2    32.7   154.6    36.1     6.2    11.2    78.8    25.5      .0      .0      .0      .0
 16   .49   246.   222.   164.     0.     7.8    30.4   146.9    27.5     7.9    15.3   102.9    32.9      .0      .0      .0      .0
 17   .52   261.   219.   165.     0.     7.4    30.4   141.5    23.7     8.5    18.6   119.2    36.3      .0      .0      .0      .0
 18   .55   276.   216.   166.     0.     7.9    33.6   144.3    24.1     7.9    18.8   121.5    33.2      .0      .0      .0      .0
 19   .58   288.   213.   166.     0.     9.0    38.0   156.2    26.6     7.1    18.3   120.8    28.9      .0      .0      .0      .0
 20   .60   298.   209.   166.     0.    10.3    42.6   177.1    29.2     6.1    17.3   117.8    23.6      .0      .0      .0      .0
 21   .62   308.   205.   167.     0.    11.6    45.6   202.0    31.6     5.3    16.3   113.6    18.6      .0      .0      .0      .0
 22   .63   315.   202.   167.     0.    13.0    46.1   226.8    35.3     5.1    16.6   112.0    16.7      .0      .0      .0      .0
 23   .63   317.   187.   167.     0.    13.9    42.8   244.1    39.7     5.5    18.3   116.5    17.1      .0      .0      .0      .0
 24   .63   317.   168.   167.     0.    13.6    35.8   238.2    41.2     6.1    20.5   124.4    18.4      .0      .0      .0      .0
 25   .63   314.   158.   167.     0.    13.8    31.3   241.7    44.3     6.9    22.9   136.3    20.2      .0      .0      .0      .0
 26   .62   310.   152.   167.     0.    13.6    27.3   240.2    45.6     7.8    25.3   152.9    22.0      .0      .0      .0      .0
 27   .61   305.   149.   167.     0.    12.8    23.7   234.9    43.8     8.7    27.1   173.1    23.8      .0      .0      .0      .0
 28   .60   301.   146.   166.     0.    11.0    19.5   218.6    37.3     9.7    27.1   193.3    26.4      .0      .0      .0      .0
 29   .59   295.   145.   166.     0.     8.6    15.3   197.9    28.0    10.6    25.3   213.9    30.0      .0      .0      .0      .0
 30   .58   290.   144.   166.     0.     6.9    12.4   186.7    20.9    11.2    22.7   227.8    33.3      .0      .0      .0      .0
 31   .57   285.   143.   166.     0.     6.5    12.2   188.6    19.3    11.8    20.7   241.3    37.4      .0      .0      .0      .0
 32   .56   280.   142.   166.     0.     7.5    14.6   206.7    22.6    12.1    18.8   249.4    40.4      .0      .0      .0      .0
 33   .55   273.   142.   165.     0.     8.8    17.6   229.6    26.9    11.8    16.9   250.0    40.4      .0      .0      .0      .0
 34   .54   268.   141.   165.     0.     9.1    18.9   237.6    27.9    10.4    14.4   236.7    35.5      .0      .0      .0      .0
 35   .52   262.   140.   165.     0.     8.2    18.0   228.2    24.8     8.0    11.3   213.3    26.1      .0      .0      .0      .0
 36   .51   256.   140.   165.     0.     6.0    16.0   212.6    19.8     6.5     9.3   203.8    19.7      .0      .0      .0      .0
 37   .50   250.   138.   164.     0.     5.5    13.7   197.8    15.2     6.6     9.8   212.6    19.5      .0      .0      .0      .0
 38   .48   241.   132.   164.     0.     4.4    11.4   180.9    11.4     7.8    12.2   240.0    23.7      .0      .0      .0      .0
 39   .46   231.   128.   164.     0.     4.1    11.2   186.8    10.0     8.8    14.2   262.0    27.0      .0      .0      .0      .0
 40   .44   219.   120.   163.     0.     4.1    12.1   199.2     9.6     8.5    14.5   263.2    25.8      .0      .0      .0      .0
 41   .41   205.   111.   163.     0.     4.2    13.2   213.8     9.4     7.2    13.1   248.9    21.1      .0      .0      .0      .0
 42   .38   189.   103.   162.     0.     4.0    13.2   223.1     8.3     5.6    11.1   231.6    15.5      .0      .0      .0      .0
 43   .34   171.    95.   161.     0.     3.6    12.2   227.2     6.8     4.6     9.7   224.6    11.8      .0      .0      .0      .0
 44   .30   151.    88.   160.     0.     3.3    10.8   228.9     5.6     4.6    10.4   248.6    11.1      .0      .0      .0      .0
 45   .27   133.    81.   160.     0.     3.1     9.7   236.7     5.0     5.0    12.2   287.2    11.2      .0      .0      .0      .0
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****  OVERFLOW RESULTS  ****                          OVERFLOW NUMBER       1              NODE     RO15

INTERVAL   QIN     QOT     QOV          SZU1    SZU2    SZU3    SZU4    SAB1    SAB2    POT3    POT4    POV1    POV2    POV3    POV4
        (L/SEC)(L/SEC)(L/SEC)          (KG)    (KG)   (E10C)   (KG)    (KG)    (KG)   (E1UC)   (KG)    (KG)    (KG)   (E1UC)   (KG)

   1        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
   2        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
   3        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
   4       65.     10.     75.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
   5      259.      9.    250.          4.3     5.6    21.8    20.8      .1      .2      .7      .7     9.2     5.5    21.0    20.1
   6      363.      9.    354.         23.2    32.4   135.0   106.0      .6      .8     3.3     2.6    22.6    31.6   131.7   103.5
   7      338.      9.    330.         23.1    36.7   169.5    93.3      .6      .9     4.4     2.4    22.5    35.7   165.1    90.9
   8      269.      9.    260.         13.8    24.7   116.7    49.2      .4      .8     3.7     1.6    13.3    23.9   113.0    47.7
   9      212.      8.    203.          8.2    18.4    82.0    27.5      .3      .7     3.3     1.1     7.9    17.7    78.7    26.4
  10      155.      8.    147.          7.7    27.4    76.9    27.2      .4     1.5     4.1     1.4     7.3    26.0    72.8    25.7
  11      107.      8.     99.           .9     4.2     8.8     3.3      .1      .3      .7      .3      .9     3.9     8.2     3.0
  12       81.      8.     73.          1.9    10.7    20.1     6.6      .2     1.1     2.0      .7     1.7     9.6    18.1     5.9
  13       68.      8.     60.           .6     7.3    11.4     2.3      .1      .9     1.3      .3      .7     6.4    10.1     2.0
  14       60.      8.     52.           .2     5.4     8.1      .4      .0      .7     1.1      .0      .2     4.6     7.0      .3
  15       48.      8.     40.           .0     4.1     5.6      .0      .0      .7      .9      .0      .0     3.4     4.6      .0
  16       34.      8.     26.           .0     3.1     3.1      .0      .0      .7      .7      .0      .0     2.4     2.4      .0
  17       22.      8.     15.           .0     1.9      .5      .0      .0      .7      .2      .0      .0     1.2      .3      .0
  18       13.      8.      5.           .0     1.1      .0      .0      .0      .7      .0      .0      .0      .4      .0      .0
  19        7.      7.      0.           .0      .7      .0      .0      .0      .7      .0      .0      .0      .0      .0      .0
  20        4.      4.      0.           .0      .4      .0      .0      .0      .4      .0      .0      .0      .0      .0      .0
  21        2.      2.      0.           .0      .2      .0      .0      .0      .2      .0      .0      .0      .0      .0      .0
  22        1.      1.      0.           .0      .1      .0      .0      .0      .1      .0      .0      .0      .0      .0      .0
  23        0.      0.      0.           .0      .1      .0      .0      .0      .1      .0      .0      .0      .0      .0      .0
  24        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  25        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  26        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  27        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  28        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  29        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  30        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  31        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  32        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  33        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  34        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  35        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  36        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  37        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  38        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  39        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  40        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  41        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  42        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  43        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  44        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0
  45        0.      0.      0.           .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0      .0

OVERFLOW TOTALS   QOV     597.      POV1     81.      POV2     172.      POV3     633.      POV4     326.
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 ****  OVERFLOW RESULTS  ****                        OVERFLOW NUMBER        2               NODE      RO28

INTERVAL   WIN      QOT      QOV          SZU1    SZU2    SZU3    SZU4    SAB1    SAB2    POT3    POT4    POV1    POV2    POV3    POV4
        (L/SEC)(L/SEC)(L/SEC)             (KG)    (KG)   (E10C)   (KG)    (KG)    (KG)   (E10C)   (KG)    (KG)    (KG)   (E10C)   (KG)

    1       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
    2       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
    3       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
    4     642.     382.     260.         59.2   146.5   165.0   294.5    35.2    87.1    98.1   175.1    24.0    59.4    66.9   119.5
    5    1964.     248.    1656.        114.4   340.2   488.7   570.3    14.9    44.3    63.6    74.2    99.5   295.9   425.1   496.1
    6    2035.     261.    1774.         92.5   314.1   605.2   438.5    11.9    40.4    77.7    56.3    80.6   273.8   527.4   382.1
    7    1571.     245.    1326.         55.4   204.3   481.4   223.5     8.6    31.9    75.2    34.9    46.7   172.4   406.2   188.6
    8    1190.     244.     946.         42.2   171.2   354.4   123.1     8.6    35.1    72.6    25.2    33.5   136.1   281.8    97.9
    9     835.     245.     590.         30.5   141.7   270.1    74.3     8.9    41.6    79.3    21.8    21.5   100.1   190.8    52.5
   10     551.     243.     308.         18.8    97.8   197.5    41.1     8.3    43.1    87.0    18.1    10.5    54.7   110.4    23.0
   11     426.     241.     186.         11.5    71.1   147.7    17.3     6.5    40.1    83.4     9.8     5.0    30.9    64.3     7.5
   12     298.     237.      61.          7.4    52.4   115.6     4.1     5.9    41.8    92.1     3.3     1.5    10.7    23.5      .8
   13     287.     237.      50.          6.2    41.4    98.7      .8     5.1    34.2    81.5      .7     1.1     7.2    17.2      .1
   14     272.     236.      36.          4.8    30.5    85.3      .6     4.2    26.4    74.0      .5      .6     4.0    11.3      .1
   15     205.     205.       0.          3.3    19.7    67.7      .6     3.3    19.7    67.7      .6      .0      .0      .0      .0
   16     153.     153.       0.          2.2    12.8    55.7      .6     2.2    12.8    55.7      .6      .0      .0      .0      .0
   17      75.      75.       0.          1.3     7.5    47.2      .6     1.3     7.5    47.2      .6      .0      .0      .0      .0
   18      44.      44.       0.           .9     4.5    41.8      .6      .9     4.5    41.8      .6      .0      .0      .0      .0
   19      19.      19.       0.           .7     2.9    38.5      .6      .7     2.9    38.5      .6      .0      .0      .0      .0
   20      12.      12.       0.           .5     1.9    36.9      .6      .5     1.9    36.9      .6      .0      .0      .0      .0
   21       7.       7.       0.           .5     1.2    36.1      .6      .5     1.2    36.1      .6      .0      .0      .0      .0
   22       6.       6.       0.           .4      .8    35.5      .6      .4      .8    35.5      .6      .0      .0      .0      .0
   23       6.       6.       0.           .4      .6    35.1      .6      .4      .6    35.1      .6      .0      .0      .0      .0
   24       6.       6.       0.           .4      .5    34.9      .6      .4      .5    34.9      .6      .0      .0      .0      .0
   25       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   26       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   27       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   28       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   29       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   30       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   31       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   32       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   33       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   34       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   35       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   36       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   37       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   38       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   39       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   40       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   41       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   42       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   43       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   44       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0
   45       6.       6.       0.           .4      .5    34.8      .6      .4      .5    34.8      .6      .0      .0      .0      .0

OVERFLOW TOTALS     QOV     2158.        POV1     325.          POV2     1145.        POV3     2125.         POV4     1368.
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****  OVERFLOW RESULTS  ****                         OVERFLOW NUMBER      3          NODE     RU38

INTERVAL    QIN     QOT     QOV         SZU1   SZU2   SZU3   SZU4   SAB1   SAB2   POT3   POT4   POV1   POV2   POV3   POV4
        (L/SEC)(L/SEC)(L/SEC)           (KG)   (KG)  (E10C)  (KG)   (KG)   (KG)  (E10C)  (KG)   (KG)   (KG)  (E10C)  (KG)

    1       32.     32.      0.          1.2    1.4   98.2    1.8    1.2    1.4   98.2    1.8     .0     .0     .0     .0
    2       40.     40.      0.          1.1    1.3   91.3    1.6    1.1    1.3   91.3    1.6     .0     .0     .0     .0
    3       40.     40.      0.          1.1    1.2   85.2    1.5    1.1    1.2   85.2    1.5     .0     .0     .0     .0
    4      170.    170.      0.           .8     .9   63.1    1.2     .8     .9   63.1    1.2     .0     .0     .0     .0
    5      520.    231.    290.          9.2   21.9  119.5   41.6    4.1    9.7   53.0   18.4    5.1   12.2   66.6   23.2
    6      834.    234.    602.         15.4   44.7  172.2   71.6    4.3   12.5   48.2   20.1   11.1   32.2  123.9   51.6
    7     1031.    241.    790.         11.7   35.8  213.0   48.0    2.7    8.4   49.7   11.2    9.0   27.5  163.3   36.8
    8      996.    240.    756.         17.2   42.0  367.9   61.2    4.1   10.1   88.5   14.7   13.1   31.9  279.4   46.5
    9     1034.    241.    793.         48.0   82.3  553.2  195.0   11.2   19.2  128.8   45.4   36.8   63.1  424.4  149.6
   10     1031.    241.    790.         28.4   51.4  310.5  114.8    6.6   12.0   72.5   26.8   21.8   39.4  238.0   80.0
   11      924.    237.    687.         34.5   76.2  376.1  140.3    8.9   19.6   96.6   36.0   25.6   56.6  279.6  104.3
   12      789.    232.    556.         46.5  115.9  537.6  196.0   13.7   34.2  158.5   57.8   32.8   81.7  379.1  138.2
   13      669.    229.    460.         39.0  113.2  494.3  168.2   13.0   37.6  164.2   55.9   26.1   75.6  330.1  112.3
   14      622.    226.    396.         30.8  100.0  455.0  127.7   11.2   36.3  165.3   46.4   19.6   63.6  289.7   81.3
   15      572.    224.    348.         21.7   80.1  385.1   82.0    8.5   31.4  150.8   32.1   13.2   48.7  234.3   49.9
   16      530.    222.    308.         17.9   71.8  348.0   61.3    7.5   30.1  145.8   25.7   10.4   41.7  202.3   35.6
   17      475.    219.    255.         15.9   66.3  303.9   49.6    7.4   30.6  140.5   22.9    8.6   35.7  163.5   26.7
   18      414.    216.    198.         15.7   67.1  281.4   47.5    8.2   35.0  146.9   24.8    7.5   32.1  134.5   22.7
   19      360.    213.    147.         15.8   66.8  272.3   46.6    9.3   39.6  161.2   27.6    6.4   27.3  111.1   19.0
   20      301.    209.     92.         15.5   63.7  267.2   43.4   10.7   44.3  185.7   30.2    4.7   19.4   81.5   13.2
   21      246.    205.     41.         14.5   56.0  254.0   39.2   12.1   46.6  211.5   32.6    2.4    9.4   42.6    6.6
   22      213.    202.     11.         14.2   48.7  248.7   38.9   13.5   46.0  235.3   36.8     .8    2.6   13.4    2.1
   23      185.    185.      0.         14.6   42.4  255.2   42.3   14.6   42.4  255.2   42.3     .0     .0     .0     .0
   24      166.    166.      0.         14.0   34.7  245.8   43.5   14.0   34.7  245.8   43.5     .0     .0     .0     .0
   25      156.    156.      0.         14.0   30.0  245.6   46.0   14.0   30.0  245.6   46.0     .0     .0     .0     .0
   26      151.    151.      0.         13.4   25.8  238.9   45.7   13.4   25.8  238.9   45.7     .0     .0     .0     .0
   27      147.    147.      0.         12.3   22.1  231.5   42.4   12.3   22.1  231.5   42.4     .0     .0     .0     .0
   28      145.    145.      0.         10.1   17.7  209.9   33.9   10.1   17.7  209.9   33.9     .0     .0     .0     .0
   29      144.    144.      0.          7.6   13.6  189.6   24.0    7.6   13.6  189.6   24.0     .0     .0     .0     .0
   30      143.    143.      0.          6.4   11.6  184.6   18.8    6.4   11.6  184.6   18.8     .0     .0     .0     .0
   31      143.    143.      0.          6.7   12.6  191.2   19.7    6.7   12.6  191.2   19.7     .0     .0     .0     .0
   32      142.    142.      0.          8.1   15.9  217.0   24.6    8.1   15.9  217.0   24.6     .0     .0     .0     .0
   33      141.    141.      0.          9.3   18.7  238.1   28.4    9.3   18.7  238.1   28.4     .0     .0     .0     .0
   34      141.    141.      0.          9.0   19.1  237.1   27.6    9.0   19.1  237.1   27.6     .0     .0     .0     .0
   35      140.    140.      0.          7.7   17.3  222.1   22.9    7.7   17.3  222.1   22.9     .0     .0     .0     .0
   36      139.    139.      0.          6.2   15.0  205.3   17.7    6.2   15.0  205.3   17.7     .0     .0     .0     .0
   37      136.    136.      0.          5.0   12.7  191.1   13.4    5.0   12.7  191.1   13.4     .0     .0     .0     .0
   38      131.    131.      0.          4.2   11.0  182.2   10.5    4.2   11.0  182.2   10.5     .0     .0     .0     .0
   39      125.    125.      0.          4.0   11.3  189.4    9.6    4.0   11.3  189.4    9.6     .0     .0     .0     .0
   40      116.    116.      0.          4.2   12.7  205.9    9.7    4.2   12.7  205.9    9.7     .0     .0     .0     .0
   41      107.    107.      0.          4.2   13.5  219.5    9.2    4.2   13.5  219.5    9.2     .0     .0     .0     .0
   42       99.     99.      0.          3.8   13.0  226.1    7.7    3.8   13.0  226.1    7.7     .0     .0     .0     .0
   43       91.     91.      0.          3.4   11.7  228.6    6.2    3.4   11.7  228.6    6.2     .0     .0     .0     .0
   44       84.     84.      0.          3.1   10.2  229.8    5.2    3.1   10.2  229.8    5.2     .0     .0     .0     .0
   45       78.     78.      0.          3.1    9.2  239.6    4.8    3.1    9.2  239.6    4.8     .0     .0     .0     .0

OVERFLOW TOTALS     QOV    2256.        POV1     255.        POV2     701.        POV3     3557.        POV4     1007.

WBRKPT  PRINTS
```

APPENDIX 11

TEST EXAMPLE FOR STATCS

delete

NOTE: This example is similar to the example contained on the computer tape.

```
@ASG,AX  *QQS.

@ASG,AX  *IF18.

@ASG,AX  *IF19.

@ASG,AX  *IF27.

@ASG,AX  *IF28.

@ASG,T  9..F14/0/POS/100

@ASG,T  11..F14///300

@USE  7,*IF27.

@USE  8,*IF28.

@XQT  *QQS.STATCS
```

Nodes of interest
--Input data
-- Exerpt of output

```
RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS                PAGE      1

   3.     $MON MAY JUNE  JULY
   4.     $GRAF    R015
   5.     $SUME
   6.     $SMU    1=BOD
   7.             2=TSS
   8.             3=FC
   9.             4=COD
  10.     $KNOT  G=3
  11.     $REG    9
  12.     $WAHL     R015
  13.     $SKAL    X=1   M=220.0   S=1
  14.           X=7    M=,33          S=1
  15.           X=8    M= 880,00      S=1
  16.           X=9    M=,220          S=1
  17.           X=10   M=,550          S=1
  18.           X=27   M=,040          S=4
  19.      ,0005 ,001 ,002 ,003 ,004 ,006 ,008 ,01 ,015 ,02
  20.           X=28   M=55,000       S=1
  21.           X=29   M=,022          S=1
  22.           X=30   M=,066          S=1
  23.           X=32   M=165,000       S=1
  24.           X=33   M=,050           S=2
  25.           X=36   M=1000,0        S=2
  26.           X=37   M=,33           S=1
  27.           X=40   M=220,0         S=1
  28.           X=41   M=0,110         S=1
  29.           X=59   M=220,0         S=1
  30.           X=61   M=330,0         S=1
  31.           X=63   M= 3000,0       S=2
  32.           X=65   M= 990,0        S=1
  33.     $EDM3   1 7 8 9 10 27 28 29 30 32 33 36 37 40 41 59 61 63 65
  34.     $ZDM3     P=9,29     E=0,25 0,50 2,50    H=0,25 1,0 5,0
  35.               P=59,8     E=0,25 0,50 2,50    H=0,25 1,0 5,0
  36.               P=28,8     E=0,25 0,50 2,50    H=0,25 1,0 5,0
  37.               P=1,8      E=0,25 0,50 2,50    H=0,25 1,0 5,0
  38.     $END

                                          0  ERROR(S),    0  WARNING(S),  0  COMMENT(S)
```

```
RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS          PAGE      2

                    SINGLE-RESULT    (  OVERFLOW      )

                      1 = Q-OVERFLOW TOTAL          ( M3 )
                      2 = P1-OVERFLOW TOTAL         ( KG )
                      3 = P2-OVERFLOW TOTAL         ( KG )
                      4 = P3-OVERFLOW TOTAL         ( KG )
                      5 = P4-OVERFLOW TOTAL         ( KG )
```

```
RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS            PAGE      4

                                     NODE:   R015

                                         1. YEAR

       1,MONTH    2,MONTH    3,MONTH
 1    .1924E+04 .8865E+04 .1666E+04
 2    .1817E+03 .5887E+03 .1962E+03
 3    .4437E+03 .1290E+04 .3727E+03
 4    .1894E+04 .8677E+04 .2051E+04
 5    .7375E+03 .2595E+04 .9267E+03

                                     TOTAL FOR WHOLE YEAR

                                      1    .1246E+05
                                      2    .9667E+03
                                      3    .2106E+04
                                      4    .1262E+05
                                      5    .4259E+04

                                         2. YEAR

       1,MONTH    2,MONTH    3,MONTH
 1    .2802E+04 .2741E+04 .1837E+04
 2    .1631E+03 .1835E+03 .1582E+03
 3    .4503E+03 .5017E+03 .3022E+03
 4    .2133E+04 .2371E+04 .2556E+04
 5    .6693E+03 .7300E+03 .6496E+03

                                     TOTAL FOR WHOLE YEAR

                                      1    .7379E+04
                                      2    .5048E+03
                                      3    .1254E+04
                                      4    .7061E+04
                                      5    .2049E+04

           TOTAL FOR ALL YEARS
                                                                   AVERAGE YEARLY VALUE
      1              .1983E+05
      2              .1471E+04                                                 .9917E+04
      3              .3360E+04                                                 .7357E+03
      4              .1968E+05                                                 .1680E+04
      5              .6308E+04                                                 .9841E+04
                                                                               .3154E+04
```

```
**************************************************
*                                                *
*              EVALUATION FOR YEAR               *
*                                                *
*                                                *
*     NODE:   R015 (          OVERFLOW      )    *
*                                                *
**************************************************

                DT =   5,00 MINUTES
               S1 = BOD
               S2 = TSS
               S3 = FC
               S4 = COD
```

```
RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS                 PAGE     107

TWO DIMENSIONAL FREQUENCY DISTRIBUTION                                   NODE:  R015        EVALUATION FOR YEAR

DURATION OF OVERFLOW
Q-OVERFLOW TOTAL                                    (PROPERTY  1)     (MIN     )
                                                    (PROPERTY  8)     (M3      )      VERTICAL SCALE
FREQUENCY IN   EVENTS                                                                 HORIZONTAL SCALE

          I
          I   80,1    160.    240.    320.    400.    480.    560.    640.    720.    800.    880.           I
          I                                                                                                  I
----------------------------------------------------------------------------------------------------------------------------
          I                                                                                                  I
          I   4.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00   I    4.00   35.50
   20.02  I                                                                                                  I
          I   4.50    3.00    1.50    1.00    1.00    0.00    0.50    0.00    0.00    0.00    0.00    0.00   I   11.50   31.50
   40.04  I                                                                                                  I
          I   2.00    1.50    3.00    1.50    0.00    0.00    0.50    0.00    0.00    0.00    0.00    0.00   I    8.50   20.00
   60.06  I                                                                                                  I
          I   1.00    0.50    0.00    0.00    0.00    0.50    1.00    0.00    0.50    0.00    0.00    0.00   I    3.50   11.50
   80.08  I                                                                                                  I
          I   0.50    1.00    0.50    0.00    0.00    0.00    0.00    0.00    0.50    0.00    0.00    0.00   I    2.50    8.00
  100.10  I                                                                                                  I
          I   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00   I    0.00    5.50
  119.90  I                                                                                                  I
          I   0.00    0.50    0.50    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.50   I    1.50    5.50
  139.92  I                                                                                                  I
          I   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.50    0.00    0.00    0.00   I    0.50    4.00
  159.94  I                                                                                                  I
          I   0.50    0.00    0.00    0.00    0.00    0.00    0.00    0.50    0.00    0.50    0.00    0.00   I    1.50    3.50
  179.96  I                                                                                                  I
          I   0.00    0.00    0.00    0.50    0.00    0.00    0.00    0.00    0.50    0.00    0.00    0.00   I    1.00    2.00
  199.98  I                                                                                                  I
          I   0.00    0.00    0.00    0.00    0.00    0.00    0.50    0.00    0.00    0.00    0.00    0.00   I    0.50    1.00
  220.00  I                                                                                                  I
          I   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.50   I    0.50    0.50
          I                                                                                                  I
----------------------------------------------------------------------------------------------------------------------------
          I                                                                                                  I
          I  12.50    6.50    5.50    3.00    1.00    0.50    2.50    0.50    2.00    0.50    0.00    1.00   I
          I                                                                                                  I
          I  35.50   23.00   16.50   11.00    8.00    7.00    6.50    4.00    3.50    1.50    1.00    1.00   I
          I                                                                                                  I
```

```
RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS                    PAGE     108

                                                                     NODE:   R015        EVALUATION FOR YEAR
TWO DIMENSIONAL FREQUENCY DISTRIBUTION

DURATION OF OVERFLOW
Q-OVERFLOW TOTAL                                      (PROPERTY  1)     (MIN      )
                                                      (PROPERTY  8)     (M3       )       VERTICAL SCALE
                                                                                          HORIZONTAL SCALE
          I
  220,00  +      *       *       *       *       *       *       *       *       *       *       *       X
          I
          I
  220,00  +      *       *       *       *       *       *       X       *       *       *       *       *
          I
          I
  199,98  +      *       *       *       X       *       *       *       *       X       *       *       *
          I
          I
  179,96  +      X       *       *       *       *       *       *       X       *       X       *       *
          I
          I
  159,94  +      *       *       *       *       *       *       *       *       X       *       *       *
          I
          I
  139,92  +      *       X       X       *       *       *       *       *       *       *       *       X
          I
          I
  119,90  +      *       *       *       *       *       *       *       *       *       *       *       *
          I
          I
  100,10  +      X       X       X       *       *       *       *       *       X       *       *       *
          I
          I
   80,08  +      X       X       *       *       *       X       X       *       X       *       *       *
          I
          I
   60,06  +              X       .       X       *       *       X       *       *       *       *       *
          I
          I
   40,04  +      .       .       X       X       X       *       X       *       *       *       *       *
          I
          I
   20,02  +      .       *       *       *       *       *       *       *       *       *       *       *
          I
          -------+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------

          80,1    160.    240.    320.    400.    480.    560.    640.    720.    800.    880.    880,


                                                              *** !  ISOLINES FOR FREQUENCY OF            0,25
                                                              XXX !  ISOLINES FOR FREQUENCY OF            1,00
                                                              ... !  ISOLINES FOR FREQUENCY OF            5,00
  RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS             PAGE    109

 ONE DIMENSIONAL FREQUENCY DISTRIBUTION                                   NODE:   R015       EVALUATION FOR YEAR

 DURATION OF OVERFLOW                                       (PROPERTY  1)

 SCALES                 20.0    40.0    60.1    80.1    100.    120.    140.    160.    180.    200.    220.
 FREQUENCIES        4.00   11.50    8.50    3.50    2.50    0.00    1.50    0.50    1.50    1.00    0.50    0.50       MIN
 SUM               35.50   31.50   20.00   11.50    8.00    5.50    5.50    4.00    3.50    2.00    1.00    0.50

 Q-OVERFLOW RATE INTERVAL VALUES                            (PROPERTY  7)

 SCALES             .300E-01.601E-01.901E-01.120    .150    .180    .210    .240    .270    .300    .330
 FREQUENCIES      217.50   92.00   55.00   34.00   16.00   11.00    5.50    5.50    5.00    3.50    3.00   15.50       M3/S
 SUM              463.50  246.00  154.00   99.00   65.00   49.00   38.00   32.50   27.00   22.00   18.50   15.50

 Q-OVERFLOW TOTAL                                           (PROPERTY  8)

 SCALES                 80.1    160.    240.    320.    400.    480.    560.    640.    720.    800.    880.
 FREQUENCIES       12.50    6.50    5.50    3.00    1.00    0.50    2.50    0.50    2.00    0.50    0.00    1.00       M3
 SUM               35.50   23.00   16.50   11.00    8.00    7.00    6.50    4.00    3.50    1.50    1.00    1.00

 Q-OVERFLOW RATE AVERAGE                                    (PROPERTY  9)

 SCALES             .200E-01.400E-01.601E-01.801E-01.100    .120    .140    .160    .180    .200    .220
 FREQUENCIES        8.00    9.50    4.50    4.50    3.00    1.50    1.00    0.50    1.50    0.50    0.00    1.00       M3/S
 SUM               35.50   27.50   18.00   13.50    9.00    6.00    4.50    3.50    3.00    1.50    1.00    1.00

 Q-OVERFLOW RATE MAXIMUM                                    (PROPERTY 10)

 SCALES             .500E-01.100    .150    .200    .250    .300    .350    .400    .450    .500    .550
 FREQUENCIES       11.00    8.00    4.50    4.00    2.00    2.00    0.50    0.50    1.00    1.00    0.50    0.50       M3/S
 SUM               35.50   24.50   16.50   12.00    8.00    6.00    4.00    3.50    3.00    2.00    1.00    0.50

 P1-OVERFLOW RATE INTERVAL VALUES                           (PROPERTY 27)

 SCALES             .500E-03.100E-02.200E-02.300E-02.400E-02.600E-02.800E-02.100E-01.150E-01.200E-01.400E-01
 FREQUENCIES      229.50   29.00   38.00   19.50   21.50   32.00   15.00   16.00   18.50   13.50   22.00    9.00       KG/S
 SUM              463.50  234.00  205.00  167.00  147.50  126.00   94.00   79.00   63.00   44.50   31.00    9.00

 P1-OVERFLOW TOTAL                                          (PROPERTY 28)

 SCALES                 5.00    10.0    15.0    20.0    25.0    30.0    35.0    40.0    45.0    50.0    55.0
 FREQUENCIES       14.00    3.50    2.50    3.00    2.00    1.00    2.50    2.00    2.00    1.00    0.50    1.50       KG
 SUM               35.50   21.50   18.00   15.50   12.50   10.50    9.50    7.00    5.00    3.00    2.00    1.50
```

```
P1-OVERFLOW RATE AVERAGE                         (PROPERTY 29)

SCALES          .200E-02.400E-02.601E-02.801E-02.100E-01.120E-01.140E-01.160E-01.180E-01.200E-01.220E-01        KG/S
FREQUENCIES     12.00    6.00    5.50    3.50    2.00    1.50    0.00    2.00    0.50    1.00    1.50    0.00
SUM             35.50   23.50   17.50   12.00    8.50    6.50    5.00    5.00    3.00    2.50    1.50    0.00

P1-OVERFLOW RATE MAXIMUM                         (PROPERTY 30)

SCALES          .601E-02.120E-01.180E-01.240E-01.300E-01.360E-01.420E-01.480E-01.540E-01.600E-01.660E-01        KG/S
FREQUENCIES     14.50    5.00    5.00    2.50    1.00    2.50    1.50    1.00    1.00    1.00    0.00    0.50
SUM             35.50   21.00   16.00   11.00    8.50    7.50    5.00    3.50    2.50    1.50    0.50    0.50

P2-OVERFLOW TOTAL                                (PROPERTY 32)

SCALES            15.0    30.0    45.0    60.1    75.1    89.9    105.    120.    135.    150.    165.          KG
FREQUENCIES     16.50    3.50    4.00    2.00    3.50    1.50    0.50    1.00    1.00    0.50    1.00    0.50
SUM             35.50   19.00   15.50   11.50    9.50    6.00    4.50    4.00    3.00    2.00    1.50    0.50

P2-OVERFLOW RATE AVERAGE                         (PROPERTY 33)

SCALES          .500E-02.625E-02.800E-02.100E-01.125E-01.158E-01.200E-01.250E-01.315E-01.400E-01.500E-01        KG/S
FREQUENCIES     12.00    4.00    3.50    4.00    0.50    1.50    3.00    1.50    1.50    1.50    1.50    1.00
SUM             35.50   23.50   19.50   16.00   12.00   11.50   10.00    7.00    5.50    4.00    2.50    1.00

P3-OVERFLOW TOTAL                                (PROPERTY 36)

SCALES            100.    125.    160.    200.    250.    315.    400.    500.    630.    800.  .100E+04        KG
FREQUENCIES     11.50    3.00    3.00    1.00    1.50    5.00    3.00    3.50    3.50    0.00    0.00    0.50
SUM             35.50   24.00   21.00   18.00   17.00   15.50   10.50    7.50    4.00    0.50    0.50    0.50

P3-OVERFLOW RATE AVERAGE                         (PROPERTY 37)

SCALES          .300E-01.601E-01.901E-01.120    .150    .180    .210    .240    .270    .300    .330            KG/S
FREQUENCIES     11.50    8.00    4.50    5.00    2.50    1.00    1.50    1.00    0.00    0.50    0.00    0.00
SUM             35.50   24.00   16.00   11.50    6.50    4.00    3.00    1.50    0.50    0.50    0.00    0.00

P4-OVERFLOW TOTAL                                (PROPERTY 40)

SCALES            20.0    40.0    60.1    80.1    100.    120.    140.    160.    180.    200.    220.          KG
FREQUENCIES     15.00    2.00    4.00    1.50    2.00    1.50    0.00    2.50    4.00    1.00    0.50    1.50
SUM             35.50   20.50   18.50   14.50   13.00   11.00    9.50    9.50    7.00    3.00    2.00    1.50

P4-OVERFLOW RATE AVERAGE                         (PROPERTY 41)

SCALES          .100E-01.200E-01.300E-01.400E-01.500E-01.600E-01.700E-01.800E-01.900E-01.100E+00.110           KG/S
FREQUENCIES     13.50    7.00    5.00    3.00    2.00    0.00    1.50    1.50    1.50    0.50    0.00    0.00
SUM             35.50   22.00   15.00   10.00    7.00    5.00    5.00    3.50    2.00    0.50    0.00    0.00
```

```
RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS            PAGE    111

P1-OVERFLOW CONCENTRATION AVERAGE                        (PROPERTY 59)

SCALES            20.0    40.0    60.1    80.1    100.    120.    140.    160.    180.    200.    220.            MG/L
FREQUENCIES       7.50    5.00    2.50    2.00    2.50    2.00    3.50    4.00    5.50    1.00    0.00    0.00
SUM              35.50   28.00   23.00   20.50   18.50   16.00   14.00   10.50    6.50    1.00    0.00    0.00

P2-OVERFLOW CONCENTRATION AVERAGE                        (PROPERTY 61)

SCALES            30.0    60.1    90.1    120.    150.    180.    210.    240.    270.    300.    330.            MG/L
FREQUENCIES       5.00    1.50    3.50    2.50    3.50    1.50    2.50    1.50    3.00    6.50    3.50    1.00
SUM              35.50   30.50   29.00   25.50   23.00   19.50   18.00   15.50   14.00   11.00    4.50    1.00

P3-OVERFLOW CONCENTRATION AVERAGE                        (PROPERTY 63)

SCALES            300.    375.    480.    600.    750.    945.    .120E+04.150E+04.189E+04.240E+04.300E+04    MG/L
FREQUENCIES       2.50    1.00    2.00    3.50    2.50    3.00    5.00    5.00    4.00    5.00    2.00    0.00
SUM              35.50   33.00   32.00   30.00   26.50   24.00   21.00   16.00   11.00    7.00    2.00    0.00

P4-OVERFLOW CONCENTRATION AVERAGE                        (PROPERTY 65)

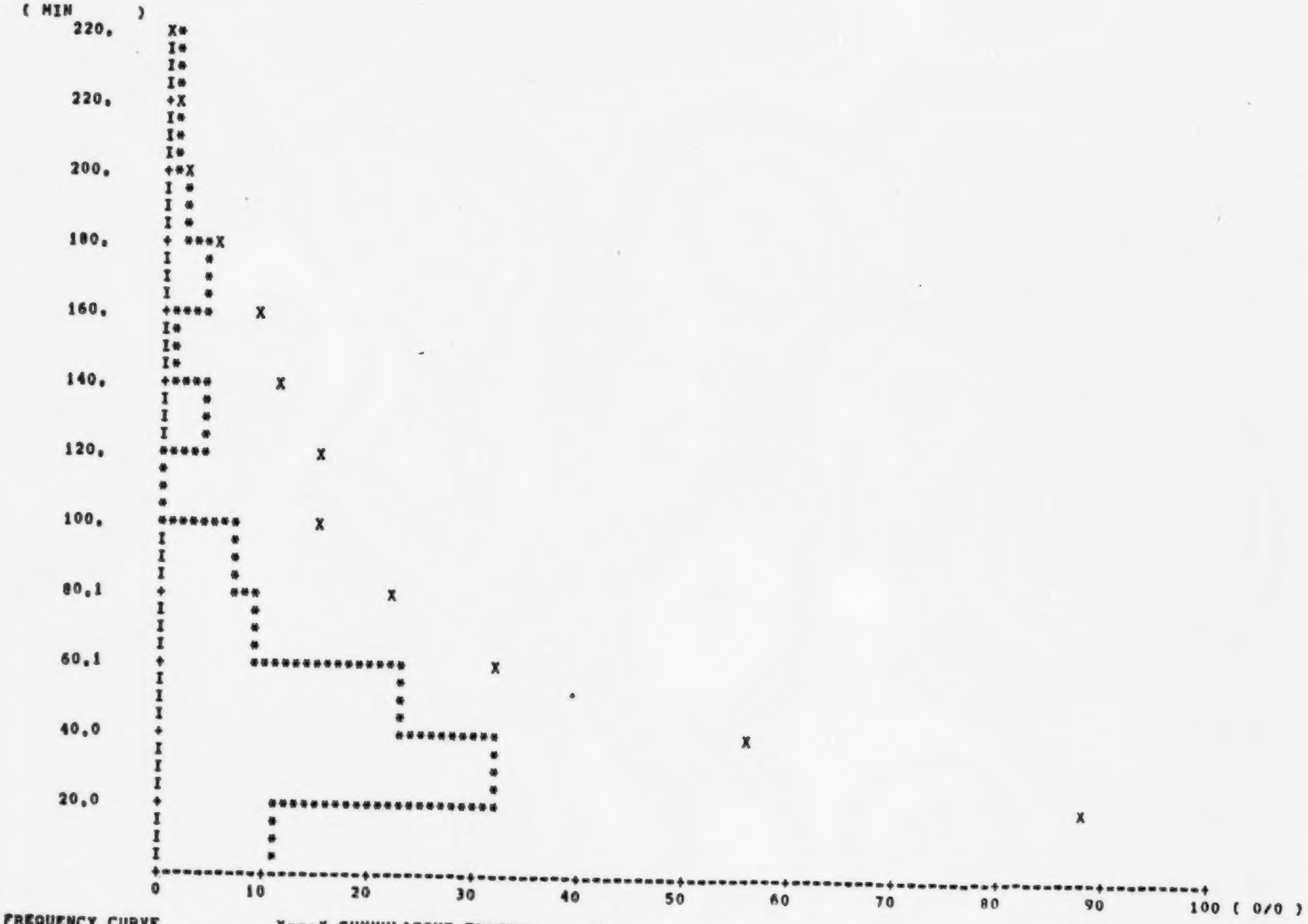
SCALES            90.1    180.    270.    360.    450.    540.    630.    720.    810.    900.    990.            MG/L
FREQUENCIES      10.00    3.50    3.50    3.50    1.00    2.00    0.50    5.00    2.50    3.50    0.50    0.00
SUM              35.50   25.50   22.00   18.50   15.00   14.00   12.00   11.50    6.50    4.00    0.50    0.00
```

RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS PAGE 112

NODE: R015 EVALUATION FOR YEAR

ONE DIMENSIONAL FREQUENCY DISTRIBUTION

DURATION OF OVERFLOW



FREQUENCY CURVE X---X CUMMULATIVE FREQUENCY CURV

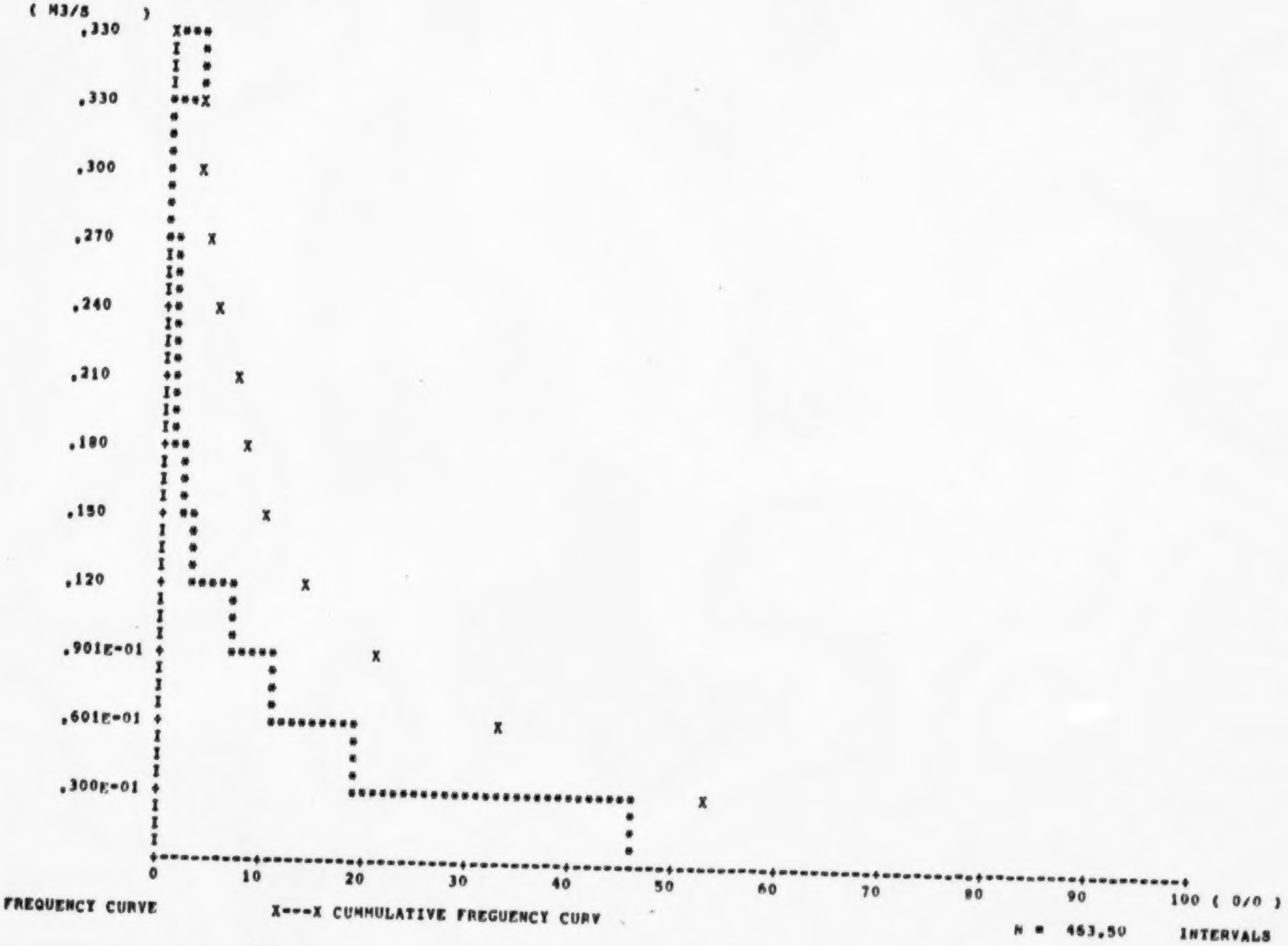
N = 35,50 EVENTS

RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS PAGE 113

NODE: R015 EVALUATION FOR YEAR

ONE DIMENSIONAL FREQUENCY DISTRIBUTION

Q-OVERFLOW RATE INTERVAL VALUES

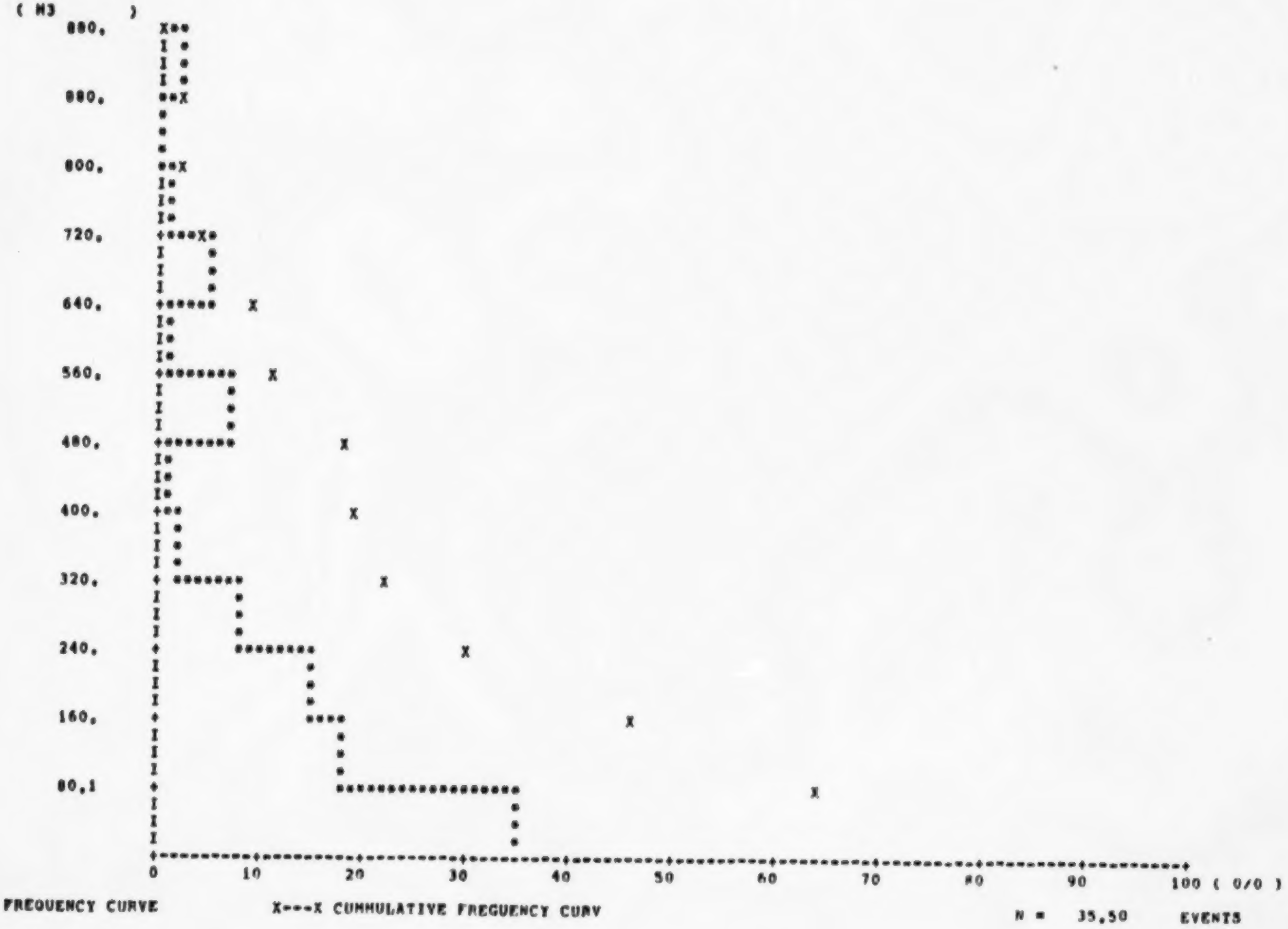


RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS PAGE 114

NODE: R015 EVALUATION FOR YEAR

ONE DIMENSIONAL FREQUENCY DISTRIBUTION

Q-OVERFLOW TOTAL



Special nodes of interest

-- Input data

-- Exerpt of output

```
RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS             PAGE      1

   3.     $SSTS
   4.     $MON MAY JUNE  JULY
   5.     $GRAF    C037
   6.     $SUME
   7.     $SMU    1=BOD
   8.             2=TSS
   9.             3=FC
  10.             4=COD
  11.     $KNOT  G=4
  12.     $REG   9
  13.     $WAHL    C037
  14.     $SKAL   X=1  M= 550,0 S=1
  15.           X=3    M=1,0         S=2
  16.           X=4    M= 16500,0    S=1
  17.           X=5    M=,44         S=1
  18.           X=6    M=1,65        S=1
  19.           X=11   M=,11         S=1
  20.           X=12   M= 880,0      S=1
  21.           X=13   M=,055        S=1
  22.           X=14   M=,22         S=1
  23.           X=16   M=2200,0      S=1
  24.           X=17   M=,15         S=2
  25.           X=20   M=33000,0      S=1
  26.           X=21   M=1,1         S=1
  27.           X=24   M=3300,0      S=1
  28.           X=25   M=,33         S=1
  29.           X=67   M=220,0       S=1
  30.           X=69   M=440,0       S=1
  31.           X=71   M=11000,0     S=1
  32.           X=73   M=770,0       S=1
  33.     $EDM4  1 3 4 5 6 11 12 13 14 16 17 20 21 24 25 67 69 71 73
  34.     $ZDM4     P=4,12     E=0,25 0,50 2,50   H=0,25 1,0 5,0
  35.               P=5,17     E=0,25 0,50 2,50   H=0,25 1,0 5,0
  36.               P=1,5      E=0,25 0,50 2,50   H=0,25 1,0 5,0
  37.               P=1,4      E=0,25 0,50 2,50   H=0,25 1,0 5,0
  38.     $END

                                                  0  ERROR(S),    0  WARNING(S),  0  COMMENT(S)
```

```
RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS            PAGE      2

                    SINGLE-RESULT    (  NODE ON THE RECEIVING BODY    )

                     1 = Q-INFLOW TOTAL                                            ( M3 )
                     2 = P1-INFLOW TOTAL                                           ( KG )
                     3 = P2-INFLOW TOTAL                                           ( KG )
                     4 = P3-INFLOW TOTAL                                           ( KG )
                     5 = P4-INFLOW TOTAL                                           ( KG )

                     6 = Q-BACKGROUND FLOW RATE RECEIVING WATERS TOTAL             ( M3 )
                     7 = P1-BACKGROUND FLOW RATE RECEIVING WATERS TOTAL            ( KG )
                     8 = P2-BACKGROUND FLOW RATE RECEIVING WATERS TOTAL            ( KG )
                     9 = P3-BACKGROUND FLOW RATE RECEIVING WATERS TOTAL            ( KG )
                    10 = P4-BACKGROUND FLOW RATE RECEIVING WATERS TOTAL            ( KG )
```

```
RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS          PAGE      3

                                     NODE:   C037

1, YEAR

               1,MONTH   2,MONTH   3,MONTH
          1     19957.    64555.    18216.
          2      2323.     5258.     2471.
          3      5250.    10840.     5297.
          4     83231.   179468.    74065.
          5      7536.    17954.     9426.
          6     16413.    57361.    15127.
          7         0.        0.        0.
          8         0.        0.        0.
          9         0.        0.        0.
         10         0.        0.        0.

                                      TOTAL FOR WHOLE

                                     1       102728.
                                     2        10052.
                                     3        21388.
                                     4       336763.
                                     5        34917.
                                     6        88901.
                                     7            0.
                                     8            0.
                                     9            0.
                                    10            0.

2, YEAR

               1,MONTH   2,MONTH   3,MONTH
          1     26392.    23665.    30034.
          2      2297.     2190.     3107.
          3      5751.     5780.     5984.
          4     82197.    78748.   126641.
          5      7194.     7026.     9432.
          6     22883.    20412.    24735.
          7         0.        0.        0.
          8         0.        0.        0.
          9         0.        0.        0.
         10         0.        0.        0.
```

```
RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS           PAGE      4


                                        TOTAL FOR WHOLE


                                       1        80091.
                                       2         7594.
                                       3        17516.
                                       4       287586.
                                       5        23652.
                                       6        68030.
                                       7            0.
                                       8            0.
                                       9            0.
                                      10            0.

OTAL FOR ALL YEARS                                          AVERAGE YEARLY VALUE
                           1           182819.                                                91409.
                           2           156931.                                                78466.
                           3            17647.                                                 8823.
                           4            38904.                                                19452.
                           5           624349.                                               312175.
                           6            58569.                                                29284.
                           7                0.                                                    0.
                           8                0.                                                    0.
                           9                0.                                                    0.
                          10                0.                                                    0.
```

```
**************************************************
*                                                *
*             EVALUATION FOR YEAR                *
*                                                *
*   NODE:    C037 (  NODE ON THE RECEIVING )     *
*                                                *
**************************************************

        DT =   5.00 MINUTES
      S1 = BOD
      S2 = TSS
      S3 = FC
      S4 = COD
```

NOTE: For statistical analysis of special nodes of interest "NODE ON THE RECEIVING" must be replaced by "SPECIAL NODES OF INTEREST" in the output.

```
  RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS          PAGE     99

                                                                       NODE:  C037       EVALUATION FOR YEAR

TWO DIMENSIONAL FREQUENCY DISTRIBUTION

Q-INFLOW TOTAL                                          (PROPERTY  4)      (M3      )          VERTICAL SCALE
P1-INFLOW TOTAL                                         (PROPERTY 12)      (KG      )          HORIZONTAL SCALE

 FREQUENCY IN   EVENTS

               I                                                                                      I
               I   80.1    160.    240.    320.    400.    480.    560.    640.    720.    800.    880.          I
               I                                                                                      I
-----------------------------------------------------------------------------------------------------------------------
               I                                                                                      I
               I   0.00    3.00    4.00    1.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00 I     8.00   25.50
     1501.50   I                                                                                      I
               I   0.00    0.50    0.50    3.00    2.50    0.00    0.00    0.00    0.00    0.00    0.00    0.00 I     6.50   17.50
     3003.00   I                                                                                      I
               I   0.00    0.00    0.00    0.00    0.50    1.00    1.00    0.00    0.00    0.00    0.00    0.00 I     2.50   11.00
     4504.50   I                                                                                      I
               I   0.00    0.00    0.00    2.50    0.50    0.50    1.00    0.00    0.50    0.00    0.00    0.00 I     5.00    8.50
     6006.00   I                                                                                      I
               I   0.00    0.00    0.00    0.00    0.00    0.50    0.00    0.50    0.00    0.00    0.00    0.00 I     1.00    3.50
     7507.50   I                                                                                      I
               I   0.00    0.00    0.00    0.00    0.00    0.00    0.50    0.50    0.50    0.00    0.00    0.00 I     1.50    2.50
     8992.50   I                                                                                      I
               I   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00 I     0.00    1.00
    10494.00   I                                                                                      I
               I   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.50    0.00    0.00 I     0.50    1.00
    11995.50   I                                                                                      I
               I   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00 I     0.00    0.50
    13497.00   I                                                                                      I
               I   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00 I     0.00    0.50
    14998.50   I                                                                                      I
               I   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00 I     0.00    0.50
    16500.00   I                                                                                      I
               I   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.50 I     0.50    0.50
               I                                                                                      I
-----------------------------------------------------------------------------------------------------------------------
               I                                                                                      I
               I   0.00    3.50    4.50    6.50    3.50    2.00    2.50    1.00    1.00    0.50    0.00    0.50 I
               I                                                                                      I
               I  25.50   25.50   22.00   17.50   11.00    7.50    5.50    3.00    2.00    1.00    0.50    0.50 I
               I                                                                                      I
```

```
RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS              PAGE     100

                                                                             NODE:   C037       EVALUATION FOR YEAR
TWO DIMENSIONAL FREQUENCY DISTRIBUTION

Q-INFLOW TOTAL                                                  (PROPERTY  4)      (M3      )       VERTICAL SCALE
P1-INFLOW TOTAL                                                 (PROPERTY 12)      (KG      )       HORIZONTAL SCALE

           I
  16500,00 +    *       *       *       *       *       *       *       *       *       *       *       X
           I
           I
  16500,00 +    *       *       *       *       *       *       *       *       *       *       *       *
           I
           I
  14998,50 +    *       *       *       *       *       *       *       *       *       *       *       *
           I
           I
  13497,00 +    *       *       *       *       *       *       *       *       *       *       *       *
           I
           I
  11995,50 +    *       *       *       *       *       *       *       *       *       X       *       *
           I
           I
  10494,00 +    *       *       *       *       *       *       *       *       *       *       *       *
           I
           I
   8992,50 +    *       *       *       *       *       *       X       X       X       *       *       *
           I
           I
   7507,50 +    *       *       *       *       *       X       *       X       *       *       *       *
           I
           I
   6006,00 +    *       *       *       .       X       X       X       *       X       *       *       *
           I
           I
   4504,50 +    *       *       *       *       X       X       X       *       *       *       *       *
           I
           I
   3003,00 +    *       X       X       .       .       *       *       *       *       *       *       *
           I
           I
   1501,50 +    *       .       .       X       *       *       *       *       *       *       *       *
           I
           -----+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------

            80,1    160,    240,    320,    400,    480,    560,    640,    720,    800,    880,    880,

                                                                   *** I  ISOLINES FOR FREQUENCY OF          0,25
                                                                   XXX I  ISOLINES FOR FREQUENCY OF          1,00
                                                                   ... I  ISOLINES FOR FREQUENCY OF          5,00
```

```
RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS          PAGE     103

                                                                  NODE:   C037       EVALUATION FOR YEAR
TWO DIMENSIONAL FREQUENCY DISTRIBUTION

DURATION OF ~~OVERFLOW~~                                 (PROPERTY  1)    (MIN    )       VERTICAL SCALE
Q-INFLOW RATE AVERAGE                                    (PROPERTY  5)    (M3/S   )       HORIZONTAL SCALE

 FREQUENCY IN   EVENTS

            I
            I  .400E-01,801E-01,120   ,160   ,200   ,240   ,280   ,320   ,360   ,400   ,440          I
            I                                                                                       I
--------------------------------------------------------------------------------------------------------------------
            I                                                                                       I
            I   0,00   0,00   0,00   0,00   0,00   0,00   0.00   0,00   0.00   0,00   0,00   0,00 I   0,00  25,50
   50,05    I                                                                                       I
            I   0,00   0,00   2,00   1,00   0,00   0.00   0,00   0,00   0,00   0,00   0,00   0.00 I   3,00  25,50
  100,10    I                                                                                       I
            I   0,00   0,00   0,00   2,00   3,00   5,50   0,50   0,50   0,00   0,00   0,00   0.00 I  11,50  22,50
  150,15    I                                                                                       I
            I   0,00   0,00   0,00   0,00   0,00   0,00   0.00   0,00   1,50   0.00   0,00   0.00 I   1,50  11,00
  200,20    I                                                                                       I
            I   0,00   0,00   0,00   0,00   0,00   0,00   0.50   0,50   0,00   1.00   0,00   0,00 I   2,00   9,50
  250,25    I                                                                                       I
            I   0,00   0,00   0,00   0,00   0,00   0,00   0.00   0,00   0,00   0,00   0,00   0,00 I   0,00   7,50
  299,75    I                                                                                       I
            I   0,00   0,00   0,00   0,00   0,00   0.00   0.50   1,00   0,50   0.00   0,00   0,00 I   2,00   7,50
  349,80    I                                                                                       I
            I   0,00   0.00   0.00   0,00   0,00   1.50   0.00   0,00   0,50   0.00   0,50   0.00 I   2,50   5,50
  399,85    I                                                                                       I
            I   0.00   0.00   0,00   0,00   0,00   0.50   0.50   0.00   0.00   0.00   0,00   0.50 I   1.50   3,00
  449,90    I                                                                                       I
            I   0,00   0.00   0,00   0,00   0,00   0,00   0.00   0,00   0,00   0,00   0,00   0,00 I   0,00   1,50
  499,95    I                                                                                       I
            I   0,00   0,00   0,00   0,00   0,00   0,00   0,50   0,00   0,50   0,00   0,00   0,00 I   1,00   1,50
  550,00    I                                                                                       I
            I   0,00   0.00   0,00   0,00   0,00   0,50   0,00   0,00   0,00   0,00   0,00   0,00 I   0,50   0,50
            I                                                                                       I
--------------------------------------------------------------------------------------------------------------------
            I                                                                                       I
            I   0,00   0,00   2,00   3,00   3,00   8,00   2,50   2,00   3,00   1,00   0,50   0,50 I
            I                                                                                       I
            I  25,50  25,50  25,50  23,50  20,50  17,50   9,50   7,00   5,00   2,00   1,00   0,50 I
            I                                                                                       I
```

NOTE: For statistical analysis of special nodes of interest replace OVERFLOW by INFLOW:

```
RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS          PAGE     104
                                                                     NODE:   C037        EVALUATION FOR YEAR
TWO DIMENSIONAL FREQUENCY DISTRIBUTION

DURATION OF OVERFLOW                                   (PROPERTY  1)    (MIN     )         VERTICAL SCALE
Q-INFLOW RATE AVERAGE                                  (PROPERTY  5)    (M3/S    )         HORIZONTAL SCALE
                I
    550,00      +   *      *      *      *      *      X      *      *      *      *      *      *
                I
                I
    550,00      +   *      *      *      *      *      *      X      *      X      *      *      *
                I
                I
    499,95      +   *      *      *      *      *      *      *      *      *      *      *      *
                I
                I
    449,90      +   *      *      *      *      *      X      X      *      *      *      *      X
                I
                I
    399,85      +   *      *      *      *      *      X      *      *      X      *      X      *
                I
                I
    349,80      +   *      *      *      *      *      *      X      X      X      *      *      *
                I
                I
    299,75      +   *      *      *      *      *      *      *      *      *      *      *      *
                I
                I
    250,25      +   *      *      *      *      *      *      X      X      *      X      *      *
                I
                I
    200,20      +   *      *      *      *      *      *      *      *      X      *      *      *
                I
                I
    150,15      +   *      *      *             .      .      X      X      *      *      *      *
                I
                I
    100,10      +   *      *             X      *      *      *      *      *      *      *      *
                I
                I
     50,05      +   *      *      *      *      *      *      *      *      *      *      *      *
                I
                ----+------+------+------+------+------+------+------+------+------+------+------+-------

                 ,400E-01,801E-01,120   ,160   ,200   ,240   ,280   ,320   ,360   ,400   ,440   ,440
```

NOTE: For statistical analysis of special nodes of interest replace OVERFLOW by INFLOW.

```
*** I  ISOLINES FOR FREQUENCY OF          0,25
XXX I  ISOLINES FOR FREQUENCY OF          1,00
... I  ISOLINES FOR FREQUENCY OF          5,00
```

```
   RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS            PAGE     107

 ONE DIMENSIONAL FREQUENCY DISTRIBUTION                                   NODE:   C037        EVALUATION FOR YEAR

 DURATION OF ~~OVERFLOW~~ INFLOW                            (PROPERTY  1)

 SCALES              50.1    100.    150.    200.    250.    300.    350.    400.    450.    500.    550.          MIN
 FREQUENCIES         0.00    3.00   11.50    1.50    2.00    0.00    2.00    2.50    1.50    0.00    1.00    0.50
 SUM                25.50   25.50   22.50   11.00    9.50    7.50    7.50    5.50    3.00    1.50    1.50    0.50

 Q-INFLOW RATE INTERVAL VALUES                           (PROPERTY  3)

 SCALES             .100E+00.125    .160    .200    .250    .315    .400    .500    .630    .800    1.00          M3/S
 FREQUENCIES       325.50   57.00   64.50   59.50  112.50  138.50  116.50  108.50   61.50   22.50   14.50   25.50
 SUM              1106.50  781.00  724.00  659.50  600.00  487.50  349.00  232.50  124.00   62.50   40.00   25.50

 Q-INFLOW TOTAL                                          (PROPERTY  4)

 SCALES             .150E+04.300E+04.450E+04.601E+04.751E+04.899E+04.105E+05.120E+05.135E+05.150E+05.165E+05  M3
 FREQUENCIES         8.00    6.50    2.50    5.00    1.00    1.50    0.00    0.50    0.00    0.00    0.00    0.50
 SUM                25.50   17.50   11.00    8.50    3.50    2.50    1.00    1.00    0.50    0.50    0.50    0.50

 Q-INFLOW RATE AVERAGE                                   (PROPERTY  5)

 SCALES             .400E-01.801E-01.120    .160    .200    .240    .280    .320    .360    .400    .440          M3/S
 FREQUENCIES         0.00    0.00    2.00    3.00    3.00    8.00    2.50    2.00    3.00    1.00    0.50    0.50
 SUM                25.50   25.50   25.50   23.50   20.50   17.50    9.50    7.00    5.00    2.00    1.00    0.50

 Q-INFLOW RATE MAXIMUM                                   (PROPERTY  6)

 SCALES              .150    .300    .450    .601    .751    .899    1.05    1.20    1.35    1.50    1.65          M3/S
 FREQUENCIES         1.00    1.50    4.00    6.50    4.00    3.00    0.00    2.50    0.50    1.50    0.50    0.50
 SUM                25.50   24.50   23.00   19.00   12.50    8.50    5.50    5.50    3.00    2.50    1.00    0.50

 P1-INFLOW RATE INTERVAL VALUES                          (PROPERTY 11)

 SCALES             .100E-01.200E-01.300E-01.400E-01.500E-01.600E-01.700E-01.800E-01.900E-01.100E+00.110      KG/S
 FREQUENCIES       233.50  468.00  129.00   73.00   51.50   38.00   29.00   27.00   16.50   11.50    6.50   23.00
 SUM              1106.50  873.00  405.00  276.00  203.00  151.50  113.50   84.50   57.50   41.00   29.50   23.00

 P1-INFLOW TOTAL                                         (PROPERTY 12)

 SCALES              80.1    160.    240.    320.    400.    480.    560.    640.    720.    800.    880.          KG
 FREQUENCIES         0.00    3.50    4.50    6.50    3.50    2.00    2.50    1.00    1.00    0.50    0.00    0.50
 SUM                25.50   25.50   22.00   17.50   11.00    7.50    5.50    3.00    2.00    1.00    0.50    0.50
```

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     RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS             PAGE     108

  P1-INFLOW RATE AVERAGE                                       (PROPERTY 13)

  SCALES             .501E-02,.100E-01,.150E-01,.200E-01,.250E-01,.300E-01,.350E-01,.400E-01,.450E-01,.500E-01,.550E-01     KG/S
  FREQUENCIES       0.00     0.00     2.00     2.50     6.00     5.00     5.50     1.50     1.50     1.00     0.00     0.50
  SUM              25.50    25.50    25.50    23.50    21.00    15.00    10.00     4.50     3.00     1.50     0.50     0.50

  P1-INFLOW RATE MAXIMUM                                       (PROPERTY 14)

  SCALES             .200E-01,.400E-01,.601E-01,.801E-01,.100     .120     .140     .160     .180     .200     .220        KG/S
  FREQUENCIES       1.00     3.00     3.00     5.00     6.00     3.50     2.50     0.50     0.50     0.00     0.00     0.50
  SUM              25.50    24.50    21.50    18.50    13.50     7.50     4.00     1.50     1.00     0.50     0.50     0.50

  P2-INFLOW TOTAL                                              (PROPERTY 16)

  SCALES              200.     400.     601.     801.     .100E+04,.120E+04,.140E+04,.160E+04,.180E+04,.200E+04,.220E+04   KG
  FREQUENCIES       1.50     7.00     4.50     4.50     1.50     0.50     3.00     1.50     0.50     0.50     0.00     0.50
  SUM              25.50    24.00    17.00    12.50     8.00     6.50     6.00     3.00     1.50     1.00     0.50     0.50

  P2-INFLOW RATE AVERAGE                                       (PROPERTY 17)

  SCALES             .150E-01,.188E-01,.240E-01,.300E-01,.375E-01,.473E-01,.600E-01,.750E-01,.945E-01,.120     .150        KG/S
  FREQUENCIES       1.00     0.50     0.50     2.00     0.50     4.00     4.00     7.50     3.50     1.50     0.00     0.50
  SUM              25.50    24.50    24.00    23.50    21.50    21.00    17.00    13.00     5.50     2.00     0.50     0.50

  P3-INFLOW TOTAL                                              (PROPERTY 20)

  SCALES             .300E+04,.601E+04,.901E+04,.120E+05,.150E+05,.180E+05,.210E+05,.240E+05,.270E+05,.300E+05,.330E+05     KG
  FREQUENCIES       0.00     3.00    10.50     2.50     2.00     1.00     2.50     2.00     0.00     1.00     1.00     0.00
  SUM              25.50    25.50    22.50    12.00     9.50     7.50     6.50     4.00     2.00     2.00     1.00     0.00

  P3-INFLOW RATE AVERAGE                                       (PROPERTY 21)

  SCALES               .100     .200     .300     .400     .500     .600     .700     .800     .900     1.00     1.10        KG/S
  FREQUENCIES       0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     7.00    13.50     4.50     0.50
  SUM              25.50    25.50    25.50    25.50    25.50    25.50    25.50    25.50    25.50    18.50     5.00     0.50

  P4-INFLOW TOTAL                                              (PROPERTY 24)

  SCALES              300.     601.     901.     .120E+04,.150E+04,.180E+04,.210E+04,.240E+04,.270E+04,.300E+04,.330E+04     KG
  FREQUENCIES       1.00     6.00     5.00     4.00     3.50     3.00     1.50     0.50     0.50     0.00     0.00     0.50
  SUM              25.50    24.50    18.50    13.50     9.50     6.00     3.00     1.50     1.00     0.50     0.50     0.50

  P4-INFLOW RATE AVERAGE                                       (PROPERTY 25)

  SCALES             .300E-01,.601E-01,.901E-01,.120     .150     .180     .210     .240     .270     .300     .330        KG/S
  FREQUENCIES       3.00     3.50     5.50     6.50     3.50     2.50     0.50     0.00     0.00     0.50     0.00     0.00
  SUM              25.50    22.50    19.00    13.50     7.00     3.50     1.00     0.50     0.50     0.50     0.00     0.00
```

```
   RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS           PAGE    109

P1-INFLOW CONCENTRATION AVERAGE                        (PROPERTY 67)

SCALES            20.0    40.0    60.1    80.1    100.    120.    140.    160.    180.    200.    220.          MG/L
FREQUENCIES      0.00    0.00    0.00    1.00    4.50    3.00    1.00    3.50    4.00    5.50    2.50    0.50
SUM             25.50   25.50   25.50   25.50   24.50   20.00   17.00   16.00   12.50    8.50    3.00    0.50

P2-INFLOW CONCENTRATION AVERAGE                        (PROPERTY 69)

SCALES            40.0    80.1    120.    160.    200.    240.    280.    320.    360.    400.    440.          MG/L
FREQUENCIES      0.00    0.50    2.50    1.00    3.50    2.00    2.50    2.00    7.50    4.00    0.00    0.00
SUM             25.50   25.50   25.00   22.50   21.50   18.00   16.00   13.50   11.50    4.00    0.00    0.00

P3-INFLOW CONCENTRATION AVERAGE                        (PROPERTY 71)

SCALES           .100E+04.200E+04.300E+04.400E+04.501E+04.600E+04.700E+04.800E+04.900E+04.100E+05.110E+05   MG/L
FREQUENCIES      0.00    0.00    0.50    0.00    1.50    3.00    3.50    5.00    5.00    5.00    1.50    0.50
SUM             25.50   25.50   25.50   25.00   25.00   23.50   20.50   17.00   12.00    7.00    2.00    0.50

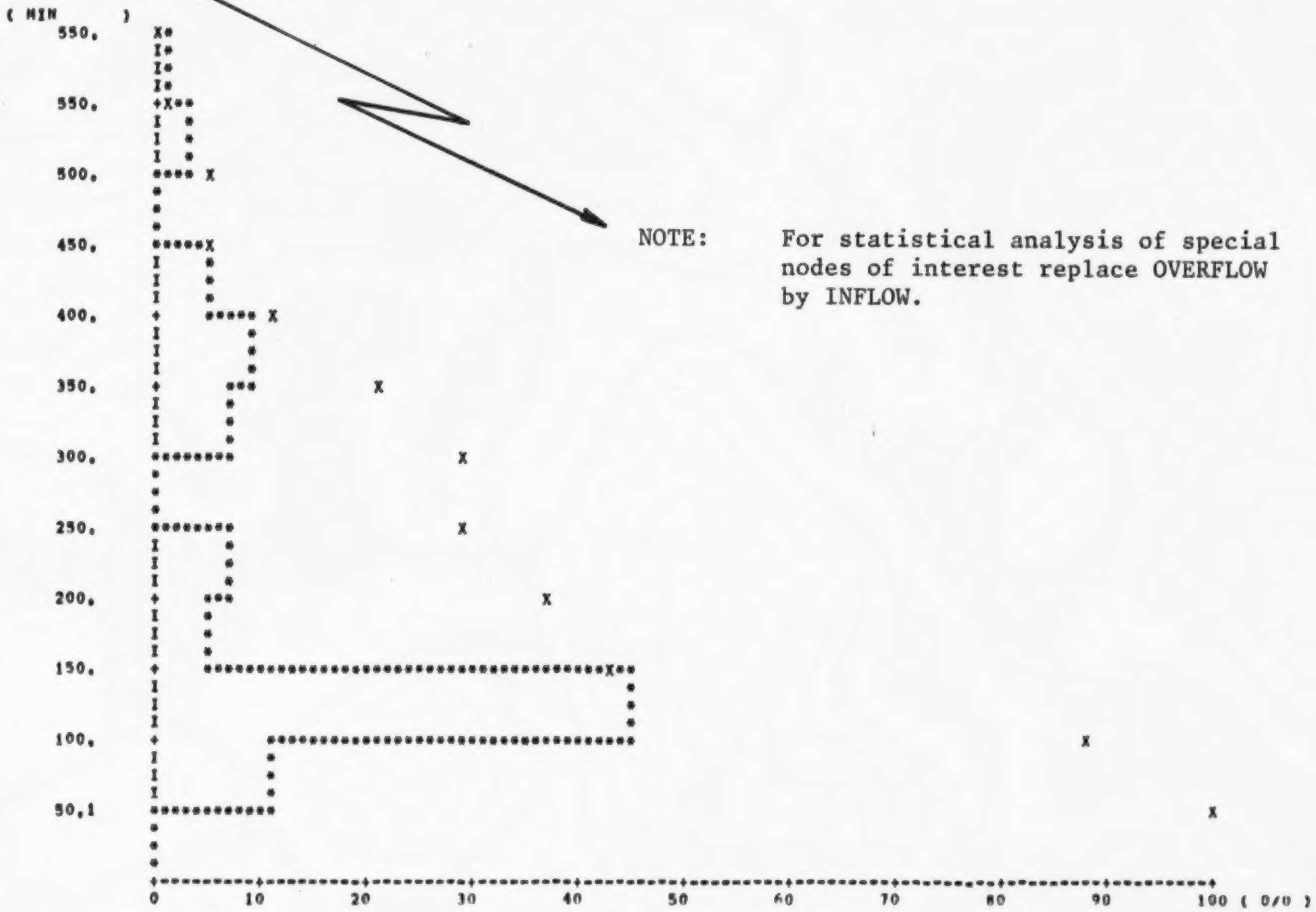
P4-INFLOW CONCENTRATION AVERAGE                        (PROPERTY 73)

SCALES            70.1    140.    210.    280.    350.    420.    490.    560.    630.    700.    770.          MG/L
FREQUENCIES      0.00    1.00    5.00    2.50    2.50    2.00    2.00    3.00    5.00    2.50    0.00    0.00
SUM             25.50   25.50   24.50   19.50   17.00   14.50   12.50   10.50    7.50    2.50    0.00    0.00
```

```
RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS            PAGE     110
                                                                     NODE:   C037        EVALUATION FOR YEAR

ONE DIMENSIONAL FREQUENCY DISTRIBUTION

DURATION OF OVERFLOW
```



NOTE: For statistical analysis of special nodes of interest replace OVERFLOW by INFLOW.

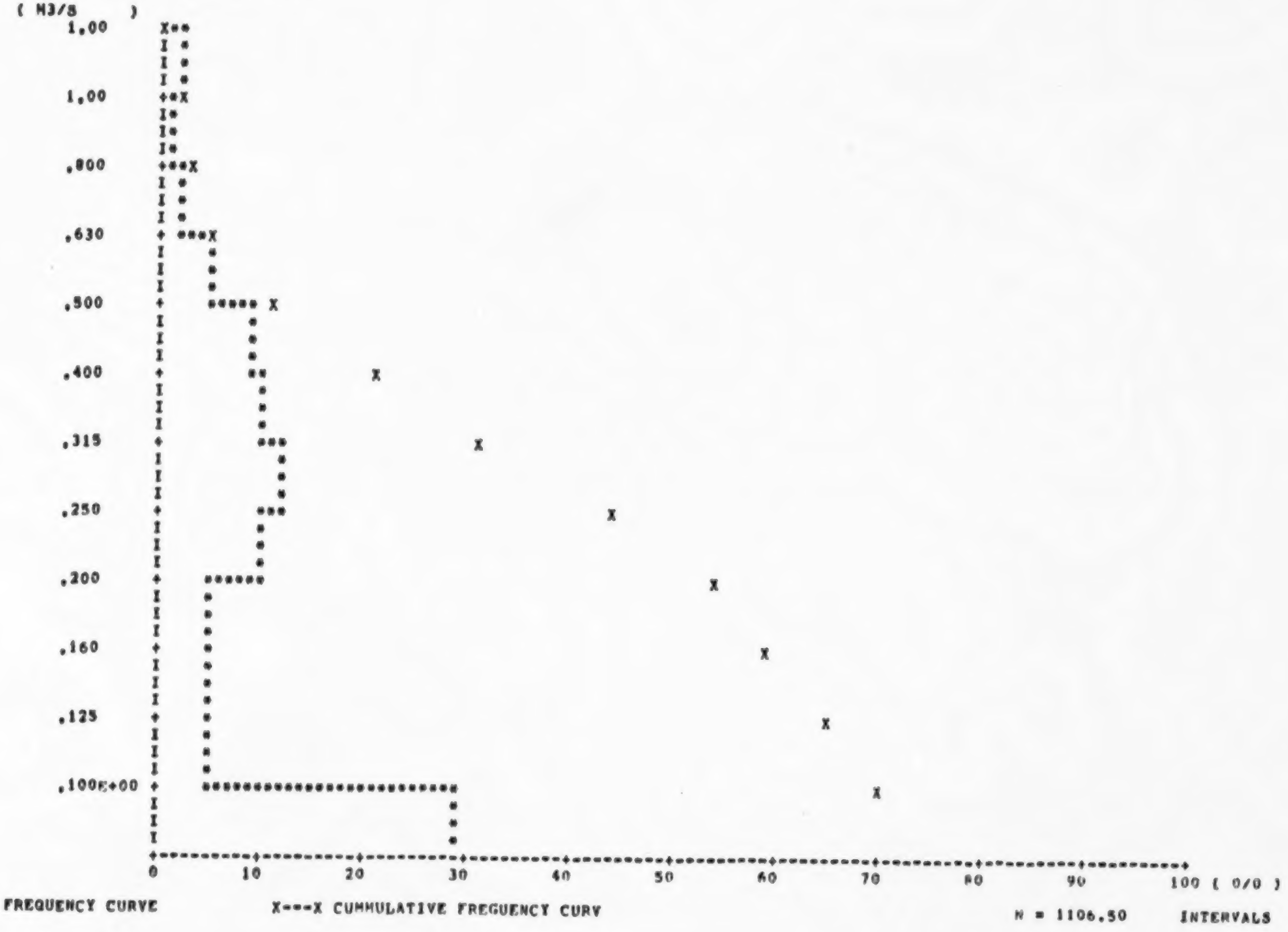
```
FREQUENCY CURVE          X---X CUMMULATIVE FREQUENCY CURV                          N =   25,50     EVENTS
```

RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS PAGE 111

NODE: C037 EVALUATION FOR YEAR

ONE DIMENSIONAL FREQUENCY DISTRIBUTION

Q-INFLOW RATE INTERVAL VALUES



```
      RECEIVING WATER LOADINGS RESULTING FROM COMBINED AND SEPARATE SEWER SYSTEMS          PAGE    112
                                                                     NODE:   C037        EVALUATION FOR YEAR
   ONE DIMENSIONAL FREQUENCY DISTRIBUTION
   Q-INFLOW TOTAL
   ( M3       )
     .165E+05 X*
              I*
              I*
              I*
     .165E+05 *X
              *
              *
              *
     .150E+05 *X
              *
              *
              *
     .135E+05 *X
              *
              *
              *
     .120E+05 *X
              I*
              I*
              I*
     .105E+05 ** X
              *
              *
              *
     .899E+04 ***X**
              I    *
              I    *
              I    *
     .751E+04 +  ***    X
              I  *
              I  *
              I  *
     .601E+04 +  **********X******
              I                  *
              I                  *
              I                  *
     .450E+04 +        ***********             X
              I        *
              I        *
              I        *
     .300E+04 +        *****************                 X
              I                        *
              I                        *
              I                        *
     .150E+04 +                        *******
              I                              *                                    X
              I                              *
              I                              *
              +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
              0         10        20        30        40        50        60        70        80        90        100 ( 0/0 )
   FREQUENCY CURVE          X---X CUMMULATIVE FREGUENCY CURV
                                                                                                    N =   25.50     EVENTS
```

APPENDIX 12

TEST EXAMPLE FOR RAINSC

NOTE: This example is similar to the example contained on the computer tape.

Input data

```
@ASG,AX  •QQS.

@ASG,AX  •TFRS.

@ASG,AX  •RAIN.

@USE  11,RAIN.

@DELETE,C  •FIRS.
FURPUR 27R2A        SL73R1 05/21/79 09:52:04

•FIRS  IS NOT CATALOGUED OR ASSIGNED
FAC STATUS: 400010000000

@ASG,T  •FIRS.,F14///500

@DELETE,C  •FRRS.
FURPUR 27R2A        SL73R1 05/21/79 09:52:05

@ASG,UP  •FRRS.,F14///500

@XQT  •QQS.RAINSC
```

```
INPUT DATA CARDS

  1 •LAN  E
  2 •MDS  5000
```

Output

```
ONE DIMENSIONAL FREQUENCY DISTIBUTION

YEARS STATISTICS FOR THE YEARS

56 60

RAINFALL DURATION  ( MIN )

SCALE          66     132     198     264     330     396     462     528     594     660
FREQ.          27       5       3       4       1     1.5       0      .5       0      .5
TOTALS       42.5    15.5    10.5     7.5     3.5     2.5       1       1      .5      .5
TOT. PC.      100   36.47   24.71   17.65    8.24    5.88    2.35    2.35    1.18    1.18

DT. SCAL      6.6    13.2    19.8    26.4      33    39.6    46.2    52.8    59.4      66
FREQ.           0       2       6     6.5     3.5     2.5     2.5       0     2.5     1.5
TOTALS       42.5    42.5    40.5    34.5      28    24.5      22    19.5    19.5      17
TOT. PC.      100     100   95.29   81.18   65.88   57.65   51.76   45.88   45.88      40

DRYSPELL  ( MIN )

SCALE        2000    4000    6000    8000   10000   12000   14000   16000   18000   20000
FREQ.        18.5     6.5     4.5     4.5       2     1.5      .5       2       1     1.5
TOTALS       42.5      24    17.5      13     8.5     6.5       5     4.5     2.5     1.5
TOT. PC.      100   56.47   41.18   30.59      20   15.29   11.76   10.59    5.88    3.53

DT. SCAL      400     800    1200    1600    2000    2400    2800    3200    3600    4000
FREQ.         8.5     1.5     3.5       4       1       2      .5       2     1.5      .5
TOTALS       42.5      34    32.5      29      25      24      22    21.5    19.5      18
TOT. PC.      100      80   76.47   68.24   58.82   56.47   51.76   50.59   45.88   42.35

TOTAL RAINDEPTH PER EVENT  ( MM )

SCALE         3.3     6.6     9.9    13.2    16.5    19.8    23.1    26.4    29.7      33
FREQ.          14      16       6       3       2      .5      .5       0       0      .5
TOTALS       42.5    28.5    12.5     6.5     3.5     1.5       1      .5      .5      .5
TOT. PC.      100   67.06   29.41   15.29    8.24    3.53    2.35    1.18    1.18    1.18

DT. SCAL      .66    1.32    1.98    2.64     3.3    3.96    4.62    5.28    5.94     6.6
FREQ.           0       2     4.5       4     3.5     2.5     4.5     3.5     2.5       3
TOTALS       42.5    42.5    40.5      36      32    28.5      26    21.5      18    15.5
TOT. PC.      100     100   95.29   84.71   75.29   67.06   61.18   50.59   42.35   36.47

AVERAGE INTENSITY PER RAINFALL EVENT  ( MM / 1000 / INT )

SCALE         270     540     810    1080    1350    1620    1890    2160    2430    2700
FREQ.         9.5      15      10     4.5      .5       1      .5      .5      .5      .5
TOTALS       42.5      33      18       8     3.5       3       2     1.5       1      .5
TOT. PC.      100   77.65   42.35   18.82    8.24    7.06    4.71    3.53    2.35    1.18

DT. SCAL       54     108     162     216     270     324     378     432     486     540
FREQ.           0       1       4     2.5       2     5.5       2       3       2     2.5
TOTALS       42.5    42.5    41.5    37.5      35      33    27.5    25.5    22.5    20.5
TOT. PC.      100     100   97.65   88.24   82.35   77.65   64.71      60   52.94   48.24
```

347

```
MAXIMUM INTENSITY OF RAINFALL EVENT  ( MM / 1000 / INT )

SCALE        800   1600   2400   3200   4000   4800   5600   6400   7200   8000
FREQ.          9   14.5      8      3      3      1    1.5      1      1     .5
TOTALS      42.5   33.5     19     11      8      5      4    2.5    1.5     .5
TOT. PC.     100  78.82  44.71  25.88  18.82  11.76   9.41   5.88   3.53   1.18

DT. SCAL     160    320    480    640    800    960   1120   1280   1440   1600
FREQ.          0      1      2    3.5    2.5      5      3    1.5    3.5    1.5
TOTALS      42.5   42.5   41.5   39.5     36   33.5   28.5   25.5     24   20.5
TOT. PC.     100    100  97.65  92.94  84.71  78.82  67.06     60  56.47  48.24

AVERAGE / MAXIMUM INTENSITY PER RAINFALL EVENT

SCALE        .09    .18    .27    .36    .45    .54    .63    .72    .81     .9
FREQ.          2      4    8.5     11    7.5      4    3.5      1     .5     .5
TOTALS      42.5   40.5   36.5     28     17    9.5    5.5      2      1     .5
TOT. PC.     100  95.29  85.88  65.88     40  22.35  12.94   4.71   2.35   1.18

DT. SCAL    .036   .072   .108   .144    .18   .216   .252   .288   .324    .36
FREQ.          0     .5    2.5    1.5    1.5      3    4.5      5      5      2
TOTALS      42.5   42.5     42   39.5     38   36.5   33.5     29     24     19
TOT. PC.     100    100  98.82  92.94  89.41  85.88  78.82  68.24  56.47  44.71

TIME TO MAXIMUM INTENSITY OF RAINFALL EVENT  ( MIN )

SCALE         55    110    165    220    275    330    385    440    495    550
FREQ.       36.5    3.5    1.5      0     .5      0      0      0      0     .5
TOTALS      42.5      6    2.5      1      1     .5     .5     .5     .5     .5
TOT. PC.     100  14.12   5.88   2.35   2.35   1.18   1.18   1.18   1.18   1.18

DT. SCAL     5.5     11   16.5     22   27.5     33   38.5     44   49.5     55
FREQ.         26    2.5    2.5    1.5      1     .5     .5     .5      1     .5
TOTALS      42.5   16.5     14   11.5     10      9    8.5      8    7.5    6.5
TOT. PC.     100  38.82  32.94  27.06  23.53  21.18     20  18.82  17.65  15.29

TIME TO MAXIMUM INTENSITY / TOTAL DURATION OF EVENT

SCALE        .08    .16    .24    .32     .4    .48    .56    .64    .72     .8
FREQ.         18      5    4.5      2    4.5      1    3.5      1      1      2
TOTALS      42.5   24.5   19.5     15     13    8.5    7.5      4      3      2
TOT. PC.     100  57.65  45.88  35.29  30.59     20  17.65   9.41   7.06   4.71

DT. SCAL    .016   .032   .048   .064    .08   .096   .112   .128   .144    .16
FREQ.         16      0     .5      1     .5      1     .5     .5    2.5     .5
TOTALS      42.5   26.5   26.5     26     25   24.5   23.5     23   22.5     20
TOT. PC.     100  62.35  62.35  61.18  58.82  57.65  55.29  54.12  52.94  47.06

RAIN DEPTH TO THE INTERVAL WITH MAXIMUM INTENSITY OF EVENT  ( MM )

SCALE        1.6    3.2    4.8    6.4      8    9.6   11.2   12.8   14.4     16
FREQ.       32.5    4.5      2      2      1      0      0      0      0     .5
TOTALS      42.5     10    5.5    3.5    1.5     .5     .5     .5     .5     .5
TOT. PC.     100  23.53  12.94   8.24   3.53   1.18   1.18   1.18   1.18   1.18

DT. SCAL     .16    .32    .48    .64     .8    .96   1.12   1.28   1.44    1.6
FREQ.         16    2.5    1.5      4    1.5      3      1     .5      2     .5
TOTALS      42.5   26.5     24   22.5   18.5     17     14     13   12.5   10.5
TOT. PC.     100  62.35  56.47  52.94  43.53     40  32.94  30.59  29.41  24.71
```

```
RAIN DEPTH TO INTERVAL WHITH MAXIMUM INTENSITY / TOTAL RAIN DEPTH OF EVENT

SCALE        .09     .18     .27     .36     .45     .54     .63     .72     .81      .9
FREQ.       19.5       4       6     5.5     2.5       2       2       0      .5      .5
TOTALS      42.5      23      19      13     7.5       5       3       1       1      .5
TOT. PC.     100   54.12   44.71   30.59   17.65   11.76    7.06    2.35    2.35    1.18

DT. SCAL    .018    .036    .054    .072     .09    .108    .126    .144    .162     .18
FREQ.         16      .5      .5     1.5       1       0       2       1       1       0
TOTALS      42.5    26.5      26    25.5      24      23      23      21      20      19
TOT. PC.     100   62.35   61.18      60   56.47   54.12   54.12   49.41   47.06   44.71

RAINFALL INTENSITY - INTERVAL VALUES  ( MM / 1000 / INT )

SCALE        800    1600    2400    3200    4000    4800    5600    6400    7200    8000
FREQ.        747      37      11       7       4     1.5     1.5       1       1      .5
TOTALS     811.5    64.5    27.5    16.5     9.5     5.5       4     2.5     1.5      .5
TOT. PC.     100    7.95    3.39    2.03    1.17     .68     .49     .31     .18     .06

DT. SCAL      80     160     240     320     400     480     560     640     720     800
FREQ.        187     249     120    83.5       0    43.5    34.5    20.5       9       0
TOTALS     811.5   624.5   375.5   255.5     172     172   128.5      94    73.5    64.5
TOT. PC.     100   76.96   46.27   31.48    21.2    21.2   15.83   11.58    9.06    7.95
```

APPENDIX 13

CONVERSION FACTORS

Multiply	By	To Obtain
acres	4047	square meters (m^2)
cubic feet	0.02832	cubic meters (m^3)
cubic feet	28.32	liters (l)
cubic feet per minute	0.4720	liters per seond (l/s)
cubic meters (m^3)	35.31	cubic feet
cubic meters (m^3)	264.2	gallons
cubic meters (m^3)	10^3	liters (l)
feet	0.3048	meters (m)
feet of water	304.8	kg per square meter (kg/m^2)
gallons (US)	0.1337	cubic feet
gallons (US)	3.785	liters (l)
gallons (US) per minute	0.06308	liters per second (l/s)
hectares (ha)	2.471	acres
hectares (ha)	$1.076*10^5$	square feet
inches	2.540	centimeters (cm)
inches of mercury	345.3	kg per square meter (kg/m^2)
inches of water	25.40	kg per square meter (kg/m^2)
kilograms (kg)	2.2046	pounds
kilograms (kg)	$1.102*10^{-3}$	tons (short)
kg per cubic meter (kg/m^3)	0.06243	pounds per cubic foot
kg per square meter (kg/m^2)	$3.281*10^{-3}$	feet of water
kg per square meter (kg/m^2)	$2.896*10^{-3}$	inches of mercury
kg per square meter (kg/m^2)	0.2048	pounds per square foot
kilometers (km)	3281	feet
kilometers (km)	0.6214	miles

Multiply	By	To Obtain
kilometers (km)	1093.6	yards
liters (l)	0.03531	cubic feet
liters (l)	61.02	cubic inches
liters (l)	10^{-3}	cubic meters (m^3)
liters (l)	$1.308*10^{-3}$	cubic yards
liters (l)	0.2642	gallons
meters (m)	3.2808	feet
meters (m)	39.37	inches
meters (m)	10^{-3}	kilometers (km)
meters per second (m/s)	1968	feet per minute
meters per second (m/s)	3.284	feet per second
meters per second (m/s)	6.0	kilometers per hour (km/hr)
meters per second (m/s)	2.237	miles per hour
miles	5280	feet
miles	1.6093	kilometers (km)
milligrams per liter (mg/l)	1	ppm
millimeters (mm)	0.03937	inches
pounds	453.6	grams
pounds per cubic foot	16.02	kg per cubic meter (kg/m^3)
pounds per square foot	4.882	kg per square meter (kg/m^2)
ppm	1	milligrams per liter (mg/l)
square feet	0.09290	square meters (m^2)
square meters (m^2)	$2.471*10^{-4}$	acres
square meters (m^2)	10.764	square feet
temp (degs C) +17.8	1.8	temp (degs Fahr)
temp (degs F) -32	5/9	temp (degs Cent) (°C)
tons (long)	1016	kilograms (kg)
tons (long)	2240	pounds
tons (metric) (t)	10^3	kilograms (kg)
tons (metric) (t)	2205	pounds
tons (short)	2000	pounds